Mechanical Engineering in Ancient Egypt, Part 69: Shabti Boxes Inscriptions

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Abstract:
This paper is the 69th research paper in a series investigating the evolution of mechanical engineering in ancient Egypt. It investigates the inscription of shabti boxes during the Middle and New Kingdoms, Third Intermediate Period and Late Periods of ancient Egypt. It outlines the design, material, decoration, inscription, owner and present location of each shabti box. The type of script used in the inscription of the shabti boxes is outlined and the technique of presenting the text on each box is investigated.

Keywords — Mechanical engineering; ancient Egypt; shabti boxes, inscriptions.

I. INTRODUCTION
This is the 69 paper in a series of research papers aiming at exploring the role of ancient Egyptians in the evolution of mechanical engineering. The paper focuses on the inscriptions of shabti boxes during a time era from the Middle Kingdom to the Late Period of ancient Egypt.

Bleiberg (2009) referred to the wooden shabti box of Amenemhat, an official from the 18th Dynasty located in the Brooklyn Museum. He outlined that the date of this box seem to be between the reigns of Pharaohs Thutmose IV and Akhenaten [1]. Milde (2012) studied the use of shabtis in the funerary practice in the ancient Egyptian society. He presented a shabti box of lady Mutemuertes from the 22nd Dynasty located in the National Museum of Antiquities at Leiden [2].

Marini (2017) studied the shabti box of Djehutyhotep lived during the reign of Ramses II of the 19th Dynasty located in the Egyptian Museum of Turin. He presented also another shabti boxes for Nefermesi from the 20th Dynasty, Nia from the 19th Dynasty, Nebhepet from the 20th Dynasty. He translated the inscriptions on the Djehutyhotep shabti box to English [3]. The British Museum (2017) presented a rectangular wooden shabti box from the 19th/20th Dynasties of the New Kingdom. They described the shabti box and stated that there was a hieroglyphic text on the box sides and on its lids [4].

The Metropolitan Museum (2018) studied a shabti box from the 19th Dynasty, reign of Pharaoh Ramses II with two compartments. It was painted and inscribed from all sides [5]. The Metropolitan Museum (2018) presented a shabti box of Paramnekhu from the 19th Dynasty, reign of Ramses II having two compartments with colored hieroglyphic text written in vertical bounded columns [6].

Tour Egypt (2018) presented the wooden shabti box of Khons, Sennedjem's son consisting of two compartments. It was inscribed by a hieroglyphic text written in four bounded un-equal columns [7]. BM Images (2018) presented a wooden shabti box from the Middle Kingdom of ancient Egypt in display in the British Museum. It had a rectangular-shaped compartments with domed lid. It was inscribed in a colored band in the middle perimeter of the box [8].

Hassaan (2018) investigated the inscriptions of the ancient Egyptians through studying the papyrus industry in ancient Egypt [9], the palettes industry [10], the stelae industry [11,12] and the ostraca industry [13].
II. SHABTI BOXES OF THE MIDDLE KINGDOM

The Middle Kingdom comprised the 11th and 12th Dynasties over a time span from 2050 to 1710 BC [14]. We have one example of using shabti boxes in the funerary practice during the Middle Kingdom. It was produced from wood and a plaster layer to allow painting and inscribing the box. It is in display in the British Museum at London and shown in Fig.1 [8]. It has a rectangular cross-section and a domed lid ladled by a colored boat. The box was inscribed using a hieroglyphic text written inside a bounded row near the middle perimeter of the box.

![Shabti box from the Middle Kingdom](image1)

Fig.1 Shabti box from the Middle Kingdom [8].

III. SHABTI BOXES OF THE NEW KINGDOM

The New Kingdom was a strong and wealthy kingdom of ancient Egypt comprising the 18th, 19th and 20th Dynasties extended over a time span from 1570 to 1077 BC [15]. The ancient Egyptians continued to produce shabtis and shabti boxes and locate them inside their tombs as one of their funerary practices. We have about 13 examples highlighting this use:

- The first example is a 350 mm height painted wooden shabti box of Henutmehyt from the New Kingdom of Egypt (1543-1069 BC) in display in the British Museum at London and shown in Fig.2 [16]. The box has a rectangular cross-section, two compartments and two vulture decorated domed lids. Besides the scenes drawn on the front side of the box, a hieroglyphic text is written within vertical bounded columns. Th shabti box was fully decorated with patterns drawn using multi-colors pigments.

![Wooden shabti box from the New Kingdom](image2)

Fig.2 Wooden shabti box from the New Kingdom [16].

- The second example is 318 mm height wooden shabti box of Amunemhat from the 18th Dynasty (1400-1336 BC) in display in the Brooklyn Museum at New York and shown in Fig.3 [17]. It has one compartment with one domed lid with carrying hands. It was inscribed in a single column in the middle of the front side using a hieroglyphic text as depicted in the zoomed image of Fig.3.

- The third example is a 355 mm height painted wood shabti of Courtier Yuya from the 18th Dynasty, reign of Pharaoh Amenhotep III (1390-1352 BC) in display in the Metropolitan Museum and shown in Fig.4 [18]. The design is similar to that of Fig.3 except the neat
production and finishing of Yuya as a noble man of the 18\textsuperscript{th} Dynasty. The inscriptions are neat written within a red-color bounded column using black ink and a hieroglyphic script. A scene of the owner came in another side of the box.

![Fig.3 Wooden shabti box from the 18\textsuperscript{th} Dynasty [17].](image1)

- The fourth example is a 320 mm height painted wooden shabti box of Nakhtmun from the 19\textsuperscript{th} Dynasty (1295-1185 BC) in display in Metropolitan Museum at New York and shown in Fig.5 [19]. The box was decorated by a scene for the owner sitting with his wife on chairs and hieroglyphic script was written in five un-equal bounded columns. The box had one compartment and one flat cover.

![Fig.5 Wooden shabti box from 19\textsuperscript{th} Dynasty [19](image2)

- The fifth example is a painted wooden shabti box from the 19\textsuperscript{th}, 20\textsuperscript{th} Dynasties (1295-1069 BC) in display in the North Carolina Museum of Art and shown in Fig.6 [20]. The box had two compartments with domed lids. The front panel was decorated by a colored scene showing the owner seated on a chair in front of an offering table and holding a sceptre by his right hand. The name of the owner was inscribed in front of his face using a hieroglyphic text written in a bounded column.

- The sixth example is a 285 mm height shabti box of Paramnekhu from the 19\textsuperscript{th} Dynasty, reign of Pharaoh Ramses II (1279-1213 BC) in display in the Metropolitan Museum and shown in Fig.7 [21]. This is an elaborated

![Fig.4 Wooden shabti box from the 18\textsuperscript{th} Dynasty [18].](image3)
production of a colored shabti box comprising two compartments with two domed lids. The front panel was decorated by a scene for the owner mummy drawn twice. A hieroglyphic text was written in four bounded columns filling the rest of the surface of the front panel.

- Fig.6 Wooden shabti box from 19th-20th Dynasties [20].

- The seventh example is a 295 mm height painted wooden shabti box of Khabekhent from the from the 19th Dynasty, reign of Pharaoh Ramses II (1292-1191 BC) in display in the Museo Arqueologico Nacional, Madrid, Spain and shown in Fig.8 [22]. The design is similar to that of Fig.7 with minor changes specially in the text.

- Fig.7 Wooden shabti box from 19th Dynasty [21].

- The eighth example is a 305 mm height shabti box of Nia from the 19th Dynasty (1292-1189 BC) in display in the Egyptian Museum at Turin and shown in Fig.9 [23].

- Fig.9 Wooden shabti box from the 19th Dynasty [23].
In this shabti box, two compartments with domed lids were used to store the owner shabtis. The box sides are full of colored scenes besides hieroglyphic text written in bounded un-equal columns.

- The ninth example is a 355 mm height painted wooden shabti box of Khons, son of Sennedjem, the Royal tomb builder during Pharaohs Seti I and Ramses II (1290-1213 BC) of the 19th Dynasty in display in the Metropolitan Museum of Art (!) and shown in Fig. 10 [24]. It has two compartments with two domed lids. The front side was decorated by the owner embalming a mummy (may be for himself). Hieroglyphic text was written in four bounded columns covering the rest of the side surface around the scenes.

Fig.10 Wooden shabti box from the 19th Dynasty [24].

- The tenth example is a 335 mm height painted wooden shabti box from the 19th -20th Dynasties (1200-1150 BC) in display in the British Museum and shown in Fig.11 [25]. It had two compartments with vaulted lids. The front panel of the box was decorated by a funerary scene for the owner offering water to a tree with hieroglyphic text written in vertical columns in the top part of the front panel.

Fig.11 Wooden shabti box from the 19th -20th Dynasties [25].

- The eleventh example is a wooden shabti box of Khaemter from the 19th -20th Dynasties (1200-1150 BC) in display in the Rijks Museum at Leiden and shown in Fig.12 [26]. It had three compartments with domed lids. The front panel of the box presented a scene for the owner offering water to a tree with hieroglyphic text written in vertical columns in the top part of the front panel.

Fig.12 Wooden shabti box from the 19th -20th Dynasties [26].
The twelfth example is a 300 mm height shabti box of Nefermesi from the 20th Dynasty (1187-1069 BC) in display in the Egyptian Museum at Turin and shown in Fig.13 [27]. The box comprised three compartments with domed lids. The panels of the box are decorated by funerary scenes and a hieroglyphic text written in vertical columns descending from the top edges of the panels.

![Fig.13 Wooden shabti box from the 20th Dynasty](image)

IV. SHABTI BOXES OF THE THIRD INTERMEDIATE PERIOD

The Third Intermediate Period of ancient Egypt comprised the Dynasties from the 21st to the 25th over a time span from 1069 to 664 BC [28]. The ancient Egyptians continued to use shabti boxes as one of their funerary activities during this Intermediate Period. Here some of the shabti boxes production during the Third Intermediate Period:

- The first example is a shabti box of Pinedjem I, the High Priest of Amun at Thebes during the 21st Dynasty (1070-1032 BC) in display in the Egyptian Museum at Cairo and shown in Fig.14 [29]. It had two compartments with flat lids. The front panel was inscribed by hieroglyphic text written in two bounded columns near the two vertical edges of the front panel.

![Fig.14 Shabti box from the 21st Dynasty](image)

- The second example is a wooden shabti box of Amenhotep, the Priest of Amun during the 21st Dynasty (1070-945 BC) in display in the British Museum at London and shown in Fig.15 [30]. The box was inscribed using the hieroglyphic text written in six columns located inside a square in the middle of the front panel of the box.

![Fig.15 Wooden shabti box from the 21st Dynasty](image)

- The third example is a 340 mm length wooden shabti box from the Third Intermediate Period (1069-664 BC) in display in the World Museum at Liverpool and shown in Fig.16 [31]. It had one compartment with a single domed lid. The front panel was...
incribed by a scene in the center and a funerary text written using hieroglyphic text in six bounded columns, three in each side of the scene.

![Fig.16 Wooden shabti box from 3rd IP][31]

- The fourth example is a painted wood shabti box from the 21st Dynasty (1000 BC) shown in Fig. 17 [32]. The box had three compartments with domed-multicolored lids. The front panel of the shabti box depicted the owner praying to Osiris with a funerary text written using a hieroglyphic script in eleven bounded columns.

![Fig.17 Wooden shabti box from 21st Dynasty][32]

- The fifth example is a 340 mm length wooden shabti box from the 22nd Dynasty (900 BC) with a jackal on its lid. It was in display as a private collection and shown in Fig. 18 [33]. It was inscribed in four bounded columns using the hieroglyphic script. Its lid was flat and the designer used the jackal statue to raise the cover.

![Fig.18 Wooden shabti box from 22nd Dynasty][33]

- The sixth example is a 410 mm height painted wooden shabti box from the Third Intermediate Period (850-700 BC) in display in the Walters Art Museum and shown in Fig. 19 [34]. The shabti box was decorated by colored scenes for some of the ancient Egyptian Deities and inscribed on its front panel by a hieroglyphic text written in a single bounded column.

![Fig.19 Wooden shabti box from 3rd IP][34]

- The seventh example is a wooden shabti box from Thebes during the 25th
Dynasty (747-656 BC) in display in the National Museums Scotland and shown in Fig.20 [35]. It consisted of one compartment with lid labelled by a Nile boat. The box was inscribed by a hieroglyphic text written within a bounded row across the middle perimeter of the box body.

- The eighth example is a 291 mm height painted wooden shabti box of Priest Hor from the 25th Dynasty (747-656 BC) in display in the British Museum at London and shown in Fig.21 [36]. The whole perimeter of the box was full of a funerary text from the book of dead written using hieroglyphic text in 16 bounded columns. Columns boundaries and text were drawn using a black ink that could sustain environmental effects for more than 2700 years.

- The ninth example is a 310 mm length painted wooden shabti box of Djit-Iset-hebsed, singer of the Sanctuary of Amun from the 25th-26th Dynasties (747-525 BC) from the collection of Old Joseph Nestor between 1910 and 1940 and was in display for sale by Pierre Berge and Associes with estimated price of 21,554 to 24,248 US$ and shown in Fig.22 [37]. The box had one compartment and one domed lid designated by the scene of two boats. The whole perimeter of the box was inscribed using the hieroglyphic text written in 22 columns with while and light brown colors alternating with each other. Black ink was used to write the text inside the columns. This is a masterpiece in the art of shabti box production. I am as an Egyptian citizen is surprising how this wonderful artefact can leave Egypt with the available administration and military facilities available nowadays !!!.
25th-26th Dynasties (747-525 BC) in display in the Petrie Museum at London and shown in Fig.23 [38]. It had one compartment with flat lid labelled by a boat. The box was inscribed on its perimeter in a red-color-bounded row using the hieroglyphic text.

V. SHABTI BOXES OF THE LATE PERIOD

The Late Period of ancient Egypt comprised the Dynasties from the 26th to the 30th over a time span from 664 to 332 BC [40]. The use of shabti boxes in the funerary practice continued to be practiced during the Late Period of ancient Egypt, but with less extend than in the New Kingdom and Third Intermediate Period. We have five examples depicting this use presented as follows:

- The first example is a shabti box of Priest Montu Neser Amun from the 26th Dynasty (664-525 BC) in display in the Kunsthistorisches Museum at Vienna, Austria and shown in Fig.25 [41]. It had one compartment and a single lid. The front panel was decorated by a colored scene for the owner presenting offerings to some of ancient Egypt deities. The was no inscriptions in the panel clear in Fig.25..

- The second example is a painted wooden shabti box of lady Nehemsbast from the Late Period (664-332 BC) in display in the National Museum of Ireland and shown in Fig.26 [42]. A scene for the owner lady was drawn in the middle of the front panel of the box surrounded by three columns from each
side of hieroglyphic text written inside bounded columns.

- The third example is a painted wooden shabti box of Pedilset from the Late Period (664-337 BC) in display in the National Museums Scotland and shown in Fig.27 [43]. It had one compartment and a single lid identified by a Nile boat. The box was inscribed on its middle perimeter in a bounded-single row.

- The fourth example is painted wooden panel from a 557 mm length shabti box from the Late Period (664-332 BC) shown in Fig.27 [44]. The panel presented a colored scene for some of ancient Egypt symbols and deities. In front of each deity, the designer wrote his name in a vertical un-bounded column using the hieroglyphic text.

- The fifth example is a shabti box of lady Tadihastet from the Late Period (664-332 BC) in display in the Egyptian Museum at Barcelona, Spain and shown in Fig.29 [45]. It had one compartment with flat lid. It was inscribed in 32 bounded columns using the hieroglyphic script. The background color of the columns changed alternatively.
VI. CONCLUSIONS
- The paper investigated the evolution of Mechanical Engineering in ancient Egypt through the shabti boxes industry during the Middle Kingdom to Late Period.
- It focused on the inscription of the shabti boxed.
- They used wood as a raw material for shabti boxes production coated with a layer of plaster for painting scenes and text using colored pigments.
- The practice of using shabti boxes in the ancient Egyptian funerary process started during the Middle Kingdom.
- They labelled some of their shabti boxes by a boat scene (or more) on its lid during the Middle Kingdom , Third Intermediate Period and Late Period.
- Multi compartments shabti boxes appeared during the New Kingdom and continued during the Third Intermediate Period.
- They extensively decorated their wooden shabti boxes during the New Kingdom, Third Intermediate and Late Periods.
- They used the hieroglyphic script to inscribe their shabti boxes since the Middle Kingdom down to the Late Period.
- They inscribed their shabti boxes in single bounded row, single bounded column and multi bounded columns.
- In some of their shabti boxes, the perimeter of the box body was full of funerary text.
- They designed box lids either flat (New Kingdom to Late Period) or domed (Middle Kingdom to Late Period).
- They combined text and scenes on the box panels during the New Kingdom through the Late Period.
- Outstanding professional inscriptions appeared in colored columns with alternative background colors during the Third Intermediate and Late Periods.

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BIOGRAPHY

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