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A Comprehensive Analysis of Five Persian Riveted Mail Armour from a Private Museum in Qazvin, Iran

Summary: This study examines five examples of Persian riveted mail armour (*zereh*) from a private collection in Qazvin, Iran, with the aim of documenting their construction features, typological variation and functional design. The analysed specimens include both frontal-opening and pullover-style mail shirts, allowing for comparison between the two principal Persian mail configurations. All pieces are constructed using riveted iron rings arranged predominantly in a 1-in-4 linkage pattern, with variations in ring size, weight and textile reinforcement. Particular attention is given to structural elements such as the *garibān-e zereh* (neck guard), sleeve construction and additional openings intended to improve mobility and wearability. The study highlights the technical sophistication and adaptability of Persian armourers, demonstrating how functional requirements, comfort, and battlefield performance were integrated into a coherent material tradition.
Keywords: Persia, mail armour, neck protection, riveted rings, armour, hauberk

Introduction

Mail armour (*zereh*) represents one of the most significant and enduring forms of defensive equipment in Persian military history. Characterised by interlinked metal rings forming a flexible yet protective mesh, Persian mail developed into a highly refined craft tradition that combined technical precision with functional adaptability.

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Over centuries, armourers in Iran produced a wide range of mail garments that responded to evolving battlefield conditions, changes in warfare technology and regional aesthetic preferences.

This study examines five examples of Persian riveted mail armour preserved in a private collection in Qazvin, Iran. These specimens provide a valuable opportunity to investigate variation within Persian mail construction, including differences in structural design, fastening systems, ring manufacture and textile integration. Particular attention is given to two principal typologies: frontal-opening mail shirts, which allow ease of wear and adjustment, and pullover-style garments, which are constructed as continuous forms and worn over the head.

These five examples of Persian armour are reported to have originated from a private family museum in Qazvin, Iran. According to the provenance history, the pieces were preserved by the family, together with other examples of arms and armour, for approximately five generations before being sold to the Alqarashi Collection in Kuwait last year. The family museum was subsequently liquidated, resulting in the dispersal of its holdings. The physical construction of the armour provides important evidence regarding its original purpose. The mail is composed of solid, closely forged rings secured with substantial rivets, features characteristic of armour intended for practical use. The strength and durability of the construction suggest that these garments were made for protection in combat rather than for purely ceremonial, theatrical, or devotional purposes. This distinction is significant in the context of Persian armour, as mail garments produced or adapted for *Ta'ziyeh* and other ritual performances can closely resemble functional military armour. In the present examples, however, the robust rings, heavy riveted construction, and overall strength of the garments appear more consistent with battlefield equipment than with armour intended primarily for ritual display.

Taken together, the Qazvin provenance, the extended history of family ownership and the distinctly martial construction of these garments provide a compelling basis for assigning them to the later Safavid–Afsharid period. Their substantial riveted rings and robust construction are characteristic of armour made for actual use and are difficult to reconcile with mail produced primarily for *Ta'ziyeh* or other ceremonial performances. These examples should therefore be regarded as functional Persian military armour, most plausibly dating from the late Safavid period through the Afsharid era, when the continued use of mail remained an important element of Iranian battlefield equipment.

Beyond their technical aspects, these armours also reflect broader historical and cultural developments. Persian mail armour is documented in both archaeological material and visual sources, and its terminology is deeply embedded in Persian literary and historical traditions. Terms such as *zereh*, *joshan*, and related expressions appear in classical texts, while depictions from antiquity through the Islamic and

Safavid periods illustrate the continued evolution of armour forms and their social significance. By analysing construction and morphological features, this study aims to contribute to a more nuanced understanding of Persian mail armour classification. It also seeks to situate these five specimens within the wider continuum of Iranian armouring practices, highlighting both continuity in technical tradition and diversity in practical design solutions.

Historical Background: Origins and Early References

Iranian armour enjoyed an outstanding reputation throughout the centuries. Persian armour makers surpassed all others in Asia in their craft and were regarded as preeminent armourers of the region. Over time, demand for Persian armour grew steadily and examples of it have been found in Arabia, the Caucasus, India, Turkey, Central Asia and Russia.[1] Regarding the depiction of mail armour in Persian contexts, reference may be made to a graffito discovered at Dura-Europos portraying a *cataphractus* (or *clibanarius*).[2] *Cataphracti* were trained as heavily armoured mounted warriors primarily to engage infantry, whereas *clibanarii* were trained to counter enemy cavalry.[3] The figure, identified first as a Parthian cataphract and dated to the 2nd century CE,[4] shows a mounted warrior wearing a tall, conical helmet with streamers attached at the apex. Typologically, this helmet is also classified as a ridge helmet.[5] However, it should be noted that identifying and interpreting the types of armour represented in iconographic sources is highly challenging, owing to the stylized and often ambiguous nature of such depictions.[6] However, subsequent scholarship has attributed this graffito to the early Sasanian period (232/233–256 CE).[7] The armour appears to consist of segments or lamellae, possibly combined with a mail aventail or even a full hood extending to the shoulders. The horizontal lines on the arms and legs may represent laminated armour.[8] Alternative interpretations exist. Connolly argues that the depiction represents scale armour with segmented plate elements

1 Robinson H.R. 1995, 17.

2 For a detailed explanation and differentiation between cataphracti and clibanarii, see: Mielczarek M. 1993.

3 Mielczarek M. 1993, 48–49.

4 Wójcikowski R.S. 2013, 233, dates it to the late Parthian period (from the second century to the early third century CE).

5 Wójcikowski R.S. 2013, 235.

6 Mielczarek M. 1993, 11.

7 See: Wójcikowski R.S. 2013, 233–234.

8 Mielczarek M. 1993, 19–20; Wójcikowski R.S. 2013, 235, describes the leg and arm protection as segment-like, laminar, curved and elongated metal plates, arranged horizontally. However, these are not laminar plates but laminated plates.

protecting the arms and lower abdomen, and dates the image to the 3rd century CE.[9] A third interpretation suggests a mail-and-plate construction: mail covering the upper torso, reinforced by two rows of vertical splints at the waist, with a mail skirt attached below.[10] This hybrid construction later became highly popular throughout the Middle East, India, and other parts of Asia, where it was known in Persian as *joshan*.[11]

The finds in Dura-Europos are used as a possible source for the identification of Sasanian armour.[12] Depictions and archaeological remains there highlight the usage of the following types of armour: laminated armour (vambraces and greaves of graffito horseman); splint armour (body armour of graffito horseman); scale armour (numerous iron scales found on site, three housings found in Tower 19, upper chest armour of graffito horseman and his horse's trapper); and mail armour (corselet found on site).[13] Mail armour, consisting of interlinked metal rings, appears to have emerged later than lamellar armour. It became widespread in Iran during the late Parthian period and gained even greater prominence under the Sasanians.[14] However, there is a controversy regarding the source of other pieces of armour in the graffito shown above. Other opinions exist as all the surviving metal scale armour has been identified as Roman by James. James identifies only the mail corselet as Sasanian based on decoration, peculiarities of construction and the find site. The depiction of the overthrow of Ardavān V by Ardašīr I, near Firūzābād (ca. 225 CE) shows a distinction between the Parthian and the Sasanian sets of armour. Allan thinks that the Parthians wore laminated and scale armour, in contrast to the Sasanians, who wore mail body armour, vambraces, laminated greaves, and, in one case, a breastplate. The Firūzābād reliefs show the Sasanians wearing long-sleeved mail shirts that reach to the wrists and to mid-thigh and laminated leg protection. Some form of cuirass or garment covers the body from neck to waist but not the arms.[15] Bivar makes the same observation regarding the representation of cavalry warfare in the friezes depicting Ardashir I at Tang-e Chogan in Firūzābād. Body armour is prominently represented, and the Parthian figures are shown wearing the older lamellar armour, whereas the Sasanian cavalrymen are depicted in mail shirts composed of interlinked metal rings.[16] Further, Bivar opines that mail armour offered several practical advantages over lamellar armour, particularly in terms of mobility, flexibility and ventilation. However,

9 Connolly P. 1998, 258–259.

10 Wójcikowski R.S. 2013, 235–236, characterises the body protection as comprising either mail or small scales, while the lower abdomen is specifically protected by two vertically arranged rows of metal lames.

11 Moshtagh Khorasani M. 2010, 191–194.

12 Note that Sasanians ruled from 224–651 CE.

13 Dwyer B., Farrokh K., Moshtagh Khorasani M. 2020, 148–149.

14 Wójcikowski R.S. 2013, 237.

15 Dwyer B., Farrokh K., Moshtagh Khorasani M. 2020, 148–149.

16 Bivar A.D.H. 1972, 275–276.

modern reconstructions and experimental armoured combat suggest that mail may actually be heavier than lamellar armour and, when worn with a gambeson — as it generally would have been — does not necessarily provide significant ventilation. The principal advantages of mail therefore appear to have been its greater flexibility and mobility, as well as its versatility and ability to be worn in combination with other forms of armour. The Firūzābād frieze of Ardashir I demonstrates that the Sasanians employed both mail and lamellar armour.[17]

Some researchers, such as Dmitriev, assume that Sasanian armour consisted of a long- sleeved mail tunic protecting the body almost to the knees, which is seen on the relief, possibly representing Khosrou II from Taq-e Bostan. Dmitriev provides some details on the Sassanian body armour in his book *Riders in Gleaming Armor: The Warfare of Sassanid Iran and the History of the Roman-Persian Wars*. He bases his research on iconographic and written sources to study mail armour and concludes that the Sasanian mail armour protected the warrior's body up to the knees. Dmitriev concludes that Sasanian armour covered the rider down to the thighs. However, this is contradicted at the beginning of the dynasty at Firūzābād, as described above, where the armour ends mid-thigh and likewise in Taq-e Bostān, where the armour also ends partway down the thigh, at least a hand's breadth above the knee. The mail shirt at Dura Europos, which is generally thought to be Sasanian, is at most 70 cm long and so would not reach the knees on a medium-sized man. Sasanian mail armour covers the neck and most of the face by means of the aventail of the helmet. The Firūzābād reliefs do not show helmets with aventails in use, but the heroic nature of the sculptures of the king and his son defeating their more armoured opponents may have been exaggerated to show the power and majesty of the Sasanian dynasty.[18]

Mail armour continued to be used even in the Safavid period (1501–1722 CE). The story of *Hossein Kord-e Shabestari* provides important information regarding the terms used for arms and armour during the reign of Shah Abbas Safavid (1587–1629 CE). The term *zereh dāvudi* is used in the text to refer to riveted mail. The term *āstin-e zereh* is used to refer to the sleeves of the armour. *Dāman-e zereh* refers to the lower parts of the mail and literally means 'mail skirt'. *Garibān-e zereh* (standard) is used to refer to the extra protection for the neck and upper parts of the breast made of mail.[19] By the mid-19th century, Floor states that the crafting of mail, cuirasses and helmets had become a thing of the past (at the end of the Qajar era, 1794–1925 CE) and that their production was subsequently reduced and abandoned. The armour that was still being manufactured was used for ceremonial rather than practical purposes.[20] Floor quotes

17 Bivar A.D.H. 1972, 277–278.

18 Dwyer B., Farrokh K., Moshtagh Khorasani M. 2020, 149–150.

19 See: Shabgahi S. 2003, 30, 51.

20 Floor W. 2003, 265.

Tahvildar, who stated that mail makers were called *zerehsāz*. Some still existed by the mid-19th century, but they were active in other occupations. Some helmet and cuirass makers brought their mail to Turkey since they still had some customers there. A few made mail at home, but it was not an important trade. Tahvildar also stated that the group of helmet and cuirass makers once comprised a large group, but their numbers were drastically reduced. For many years, they found buyers in Turkey (Istanbul) and other countries. Some people continued to make helmets and cuirasses in Isfahan. Floor states that traditional armour was not only made in Isfahan but also in Khorasan and Shiraz. A *kaftan* or *jivirak* was worn under the *jošan* or *zereh*, offering extra protection to the body.[21]

Mail armour was called *zereh* زره that was already mentioned by Ferdowsi.[22] Another term used to refer to mail armour in Persian is *der'* درع (pl. *doru'* دروع, *adrā'* ادراع, *adro'* ادرع, *derā'* دراع), which was also used in the *Šāhnāme* (*Book of Kings*).[23] *Digital Lexicon of Dehkhoda* describes that *der'* درع is a cloth that is made/weaved from iron mail and is used to protect the body during the war. Mail was also called *jayba* جیبه.[24] Mail armour was worn together with a gambeson, which was called *der' va xaftān* درع و خفتان [25] or *der' va xaftān-e mokammel* درع و خفتان مکمل (mail armour and gambeson). They complete each other and go together.[26] Gambeson was also called *gabr* or *gabar* گبر (*Šāhnāme*): "He is wearing mail armour, *jošan* جوشن armour, and a padding, he yells like a thundering cloud."[27]

Mail armour can be classified into two general types: pure mail (*zereh*) and mail and plate (*joshan*). The rings can be riveted, punched, welded, or simply butted.[28] Riveted mail was called *zereh dāvudi* (*davudi* style mail) or *zereh mixgerd* (mail with rounded nails), and butted mail was called *zereh mamuli* (common mail). *Zereh dāvudi* was a sturdy mail with small rings, and the rings were linked through each other and riveted closed.[29] Another term to refer to riveted mail was *der'-e dāvudi* درع داودی a riveted mail armour.[30] Although butted mail rings were generally used to make ceremonial mail armour, some were hardened and could be used on the battlefield. It should be noted that Japanese mail makers also used hardened butted rings for making battlefield armour. Mail was made from small rings, each ring connected to four others.

21 Floor W. 2003, 265; Matufi A. 1999, 221, 348–349.

22 Ferdōsi H.A. 1995, 1351.

23 Ferdōsi H.A. 1995, 191.

24 DLD 2026.

25 Eskandar Beig T. 2003, 701.

26 Esterābādi M.M.M. 1991, 12.

27 زره دارد و جوشن و خود و گبر | بغرّد به کردار غرّنده ابر (*Zereh dārad va jošan va xud va gabr | beqorrad be kerdār qorrande abr*). Ferdōsi H.A. 1995, 442.

28 Zeller R., Rohrer E.F. 1955, 35.

29 Shahidi E. 2001, 405.

30 Nezāmi Ganje'I N.M.Y.Z.M. 1999, 133.

This is called the four-into-one construction.[31] The bulk of a mail would be four-into-one rings, but it could be tailored for a precise fit by adding or removing links at different places to loosen or tighten the fit, while gussets could be added to places that needed a lot of stretch, such as elbows and underarms, without making the garment around that area sag. Adding or removing links in adjoining rows creates bits of three-into-one or five-into-one, which allows precise fitting for comfort. Isfahan was a major centre for making quality mail.[32] *Joshan* is a mail-and-plate construction in the shape of jackets or coats from steel mail with two, four, or eight steel plates arranged in two rows with a buckle in front and three or five rows of small tiles on the back; these were arranged similarly to roof tiles. Some *joshans* show the small tiling on the front.[33] Quoting the lexicon *Annanderaj, the Digital Lexicon of Dehkhoda* states that *joshan* was a combination of mail and plate, whereas *zereh* stands for mail only. *The Lexicon of Borhān* confirms that *zereh* consists of different rings to offer protection for the body and is worn to go to war. Ferdowsi uses both terms *joshan* and *zereh* in his epic *Shāhnāme*. Both are used in *Tārikhe Sistān* as well.[34]

Another type of armour used was *qazāgand* قزاگند. It consisted of mail armour sandwiched between two layers of light padding.[35] Usamah Ibn-Munquidh describes a particularly heavy version made with two layers of mail.[36] Usamah talks about wearing a *qazāgand* constructed of two layers of mail during an incident when Saladin admonishes him for not donning his armour before a battle. He replies: "By Allah I cannot put on anything more. We are in the early part of the night and my kazaghand is furnished with two coats of mail, one on top of the other. As soon as I see the enemy I shall put it on." After the battle he demonstrates the armour's construction to Saladin. "I pulled out my knife and ripped it at the breast and disclosed the side of the two coats of mail. The kazaghand enclosed a Frankish coat of mail extending to the bottom of it, with another coat of mail on top of it reaching as far as the middle. Both were equipped with the proper linings, felt pads, silk stuffing (al-lasin) and rabbits' hair." In Europe, this armour was called a *jazerant,* and Blair suggests that the word is a derivative of *qazāgand*.[37] In the *Farhang-e Nafisi*, Nafisi provides two meanings for *qazāgand*:

a. a cloth that is filled with wool and silk and worn in battle and

b. mail armour[38]

31 Kobylinsky L. 2000, 68.

32 Zeller R., Rohrer E.F. 1955, 35.

33 Kobylinsky L. 2000, 68.

34 See: DLD 2026.

35 Also see: Nicolle D. 1998, 15.

36 Ibn-Munquidh U. 1978, 197, 130–131.

37 Blair C. 1958, 23.

38 Nafisi A.A. 1964, 2658.

Some mail armour have long sleeves and some short sleeves and come in different sizes. The mail was put over the head and had a textile collar at the neck. There was also mail in the shape of a jacket that could be buttoned at the front or in the form of a long coat. Strong mail had larger diameters of 10–15 mm and was heavier and stiffer, whereas the lighter mail was more delicate and elastic with link diameters as small as 4 mm. The diameter of the mail was a factor determining its flexibility and strength.[39] Some mail had alternate rows of solid links punched from sheet metal, and some researchers assume the purpose of these solid links was to make the armour more immune to piercing. However, the more likely reason for this type of construction is to increase the speed of production. If the armourer had access to pre-made solid links, he could insert two links at a time but only need to rivet one of them, thus almost halving the time needed to assemble the mail. Sometimes, copper or brass rings were mixed with steel and iron rings for decorative purposes.[40] These rings were put among the steel rings in such a way that certain patterns, such as rhombuses or waves, were formed.

In analysing a Persian mail hauberk from the 15th century CE, Rose surprisingly discovered that six different forms of rings were used to make the mail. Generally, there are either riveted or punched rings.[41] The riveted rings are drawn, elliptical in their profile, and used for connecting the rings. Each of the riveted rings is 1.5 mm wide and is connected to four punched (embossed) rings. The ends of the punched rings are not welded to each other. Instead, they are punched from sturdy iron sheet metal using a punching tool. Thus, the punched rings are made of one single piece and can be identified by the sharp ridges or burrs of their periphery. The punched rings are 2 mm wide and of various strengths. On some riveted rings, which were hammered flat, the width of the ring goes up to 5 mm.[42] Different forms of punched rings make this mail very special. On the front and back sides of the left breast are punched rings that are ornamented with two concentric circles. There are also punched rings ornamented with a sigmoidal, wavy, S-shaped, arabesque design. On the right side of the breast, the front side has punched rings with inscriptions, and the right side on the back once again has a sigmoidal, arabesque design. The odd aspect of this mail is that the rings have different inscriptions from the *Qur'an*.[43] For example, one of the rings has the following inscription that can be found on many oriental arms: *La fata ella Ali, la seif ella Dhulfaghar* (There is no young [brave] man but Ali, there is no sword but Dhulfighar). Another ring bears the inscription *Ali*, *Hassan*, *Fatima* while another repeatedly says, *Allah ta ala* (Praise God). Unfortunately, Rose was unable to provide

39 Kobylinsky L. 2000, 68.

40 Zeller R., Rohrer E.F. 1955, 35.

41 Rose W. 1902–1905, 9.

42 Rose W. 1902–1905, 10.

43 Rose W. 1902–1905, 10.

either a transcription or a translation for the other rings and just mentioned that there are many other rings with different transcriptions that had to be translated. Rose hypothesises that since the names of Ali (the first Imam of the Shiites and the fourth Caliph), Hassan (his first son and the second Imam of the Shiites) and Fatima are all Shiite saints, this mail was probably an old Persian work. This mail bears the signature *Mohammad II*.[44]

Some Terms Related to Mail Armour in Persian Manuscripts

Mail armour is called *zereh* in Persian. This term derives from the older form *zrâdha*, which appears in the *Vendidad* (Fargard 14, verse 9). During the Sassanian era, *zrâdha* was preserved in the *Vendidad*, while *zrêh* became the more common term for armour.[45] Another term is *zerehdār* زرەدار: someone who is wearing mail armour; armoured, armoured man.[46] A warrior who wore mail armour was called *zerehpuš* زره پوش.[47] Another type of mail armour was called *zerehin* زرهین.[48] There are different terms in Persian that describe the makers of mail. These include *zerehbāf* زرەباف, mail maker, *zerehsāz* زره ساز: mail armour maker,[49] and *zerehgar* زرەگر: mail-armour maker.[50] The craft of making mail armour is called *zerehgari* زرەگری.[51]

Different parts of a mail armour are called as follows:[52]

a. Mail armour made of butted mail rings was called *zereh-e ma'muli* زره معمولی (lit. common mail). Mail armour made of riveted rings was called *zereh-e mixgerd* زره میخ گرد: riveted mail; a sturdy mail with small rings that are linked through each other and riveted closed.[53] Riveted mail was also called *zereh-e dāvudi* زره داودی. This was a type of mail armour attributed to the Prophet Dāvud and made by him.[54] It is used to refer to a riveted mail, a sturdy mail with small rings that are linked through each other and riveted closed. Dehkhoda explains that *zereh dāvudi* زره داودی is a type of mail armour where sword strikes and arrows cannot pierce it. This term is used to describe mail made in the *dāvudi* داودی style.

44 Rose W. 1902–1905, 9.

45 See: Pur Davood E. 1969, 19; Matufi A. 1999, 219. For additional attestations of the term in the *Avesta*, see: the "Srosh Yasht", verses 23 and 45.

46 Ferdŏsi H.A. 1995, 284.

47 Asadi Tusi H. 1938, 1317.

48 Mobārak Šāh Faxr-e Modabbar M.M.S. 1967, 369.

49 Āsef M.H. 2003, 89.

50 Manučehri Dāmqāni A.A.G.A. 1984, 60.

51 See: DLD 2026.

52 For more information on the following terms, see: Moshtagh Khorasani M. 2010.

53 Shahidi E. 2001, 405.

54 Manučehri Dāmqāni A.A.G.A. 1984, 178.

It is different from (and likely superior to) *zereh-e mamuli* زره معمولی, which is lighter and less resistant to arrows. The following mail has rings made of riveted rings.

b. *čambar-e zereh* چنبر زره an individual ring of a mail armour.[55] It is also called *halqe-ye zereh* حلقه زره mail ring.[56] A riveted ring was called *halqe-ye mixi* حلقه میخی riveted mail ring.[57] Based on the number of rivets in each ring of the mail armour, rings can be classified as *halqe-ye yekmixi* حلقه یک‌میخی, a mail ring with one rivet, *halqe-ye domixi* حلقه دومیخی, a mail ring with two rivets, and *halqe-ye semixi* حلقه سه‌میخی, a mail ring with three rivets.[58] A brazed mail ring was called *halqe-ye lahimi* حلقه لحیمی. And a riveted brazed mail ring was called *halqe-ye lahimi bā mix* حلقه لحیمی با میخ.[59] The rings of this mail armour are *halqe-ye yekmixi* حلقه یک‌میخی (mail ring with one rivet).

c. *garibān-e zereh* گریبان زره the standard or neck protection of the mail armour.[60] The origins of this word go back to the Middle Persian word *garīvpān*.[61] The neck protection of this mail is made of canvas and linen and dyed in blue.

d. *āstin-e zereh* آستین زره sleeves of armour of this mail armour are short.[62]

e. *nimzereh* نیم زره: half mail armour; a short mail armour, covering the body and half of the sleeves.[63] This mail armour is a short mail armour covering up to the elbows.

f. *čāk-e zereh* چاک زره opening of a mail armour.[64] The following mail armour has a frontal opening with two clasps for closing it. It also has a back opening starting at the tailbone.

g. *band-e zereh* بند زره the straps that tighten the mail armour.[65]

h. *zereh-e tang halqe* زره تنگ حلقه: a tightly woven mail; a dense weave. This type of mail armour was intended to resist armour-piercing arrows. Mail armour was made with different ring sizes. Some had larger rings and some smaller ones. For a mail armour made of small rings, other terms were also used, such as *zereh-e tang halqe-ye dāvudi* زره تنگ حلقه داودی: mail armour with small and tightly woven riveted rings or *zereh-e tang-e dāvudi* زره تنگ داودی: a tightly woven mail in the *dāvudi* داودی (riveted) style[66] and *zereh-e xord halqe* زره خرد حلقه: a mail armour with

55 Xonji Esfahāni F. 2003, 149.
56 Nezāmi Ganje'i N.M.Y.Z.M. 1998, 164.
57 Romanowsky D. 1967c, picture 27.
58 Moshtagh Khorasani M. 2010; Romanowsky D. 1967c, picture 27.
59 Moshtagh Khorasani M. 2010; Romanowsky D. 1967c, picture 27.
60 Šabestari A.Š. (ed.), 2003, 56.
61 Farahvashi B. 2002a, 525.
62 Šabestari A.Š. (ed.), 2003, 30.
63 Dorudbāši Beihaqi N.A.M.A.Š. 1975, 135.
64 Asadi Tusi H. 1938, 448.
65 Ferdōsi H.A. 1995, 1321.
66 Šabestari A.Š. (ed.), 2003, 30.

small rings.[67] Tightly woven mail armour was called *zereh-e zarandud-e tang halqe* زره زراندود تنگ حلقه: a gilded, tightly woven mail.[68]

i. *zerehkolāh* زرهکلاه: head protection made of mail armour; mail coif.[69] It is also called *kolāh zereh* کلاه زره. It is also called *misurka* in the West. Any ring in this mail was called *halqe-ye češm-e zereh* حلقه چشم زره.[70]

j. *zereh dāman* زره دامن: the skirt of mail armour.[71]

k. *češm-e zereh* چشم زره: eye opening in the mail coif.[72]

l. *simin zereh* سیمین زره: silver mail armour; mail armour decorated with silver inlay/overlay.[73]

m. *zarrin zereh* زرین زره: gilded mail armour.[74] It is also called *zereh-i zarrin* زرهی زرین: golden mail armour; mail armour decorated with gold inlay or overlay.[75] It is also called *der'-e mozarrad* درع مزّرد: mail armour with rings.[76]

n. *meškin zereh* مشکین زره: black/dark mail armour; a mail armour with blackened rings.[77]

o. Weapons which were used to penetrate and cut mail armour were called *zerehduz* زره دوز: mail cutter, armour cutter; an arrowhead meant to pierce mail armour[78] and *zerehgozār* زرهگذار: something which pierces the mail armour.[79]

Analysis of Five Mail Armour from a Private Collection in Qazvin, Iran

There are two main types of Persian mail armour. The first and most common type has a frontal opening, with both sides connected via clasps and hooks.[80] This design allows the wearer to put the armour on more easily, similar to a coat, and provides a customisable fit. The second type is a pullover style, which is slipped on over the head

67 Tarsusi A. 1977. 2, 134.

68 Tartusi A. 1977. 3, 365.

69 See: DLD 2026.

70 al-Jāmi M.I.E. 2001, 395.

71 See: DLD 2026.

72 Romuz-e Hamze. 1940, 476.

73 Asadi Tusi H. 1938, 333.

74 Sabā F.X.K., 237.

75 Šabānkāre'i M.A.M. 2002, 278.

76 Manučehri Dāmqāni A.A.G.A. 1984, 18.

77 Asadi Tusi H. 1938, 366.

78 Matufi A. 1999, 446.

79 See: DLD 2026.

80 For a riveted example of this type of Persian mail armour from the Bonyād Museum in Tehran, Iran, see: Moshtagh Khorasani M. 2010, 539, cat. 56. For examples of Persian mail armour with a frontal opening from the Polish collections, see: Chodyński A.R. 2000, 219, cat. 14, 222, cat. 25–26, 223, cat. 27. For an example of a Persian mail armour in the Museum of Bern (Switzerland), see: Zeller R., Rohrer E.F. 1955, table I, table II, table V. For a riveted Persian mail armour of this style from the Military Museum of Bandar Anzali, see: Moshtagh Khorasani M. 2006, 726, cat. 419.

like a traditional hauberk.[81] While the pullover style may offer slightly better structural integrity without a frontal seam, the front-opening type was preferred for convenience, especially when worn over heavy padding or in combination with other armour pieces. The following article analyses five mail armour specimens from a private museum in Qazvin, Iran. Among these, three feature a frontal opening secured by clasps and hooks — the most common Persian design — while the remaining two are pullover-style mail shirts, which lack a frontal seam and are donned over the head.

Particularly important in this regard is the *Tārikh-e Jahāngoshāye Nāderi* by Mohammad Mehdi Khan Estarābādi.[82] The work is especially valuable for the study of Persian military equipment because its illustrations are noted for their relatively realistic depiction of contemporary arms and armour, including complete mail garments. The book depicts both front-opening[83] and pullover forms of mail,[84] providing visual evidence that these two styles were used within the same Persian military tradition. The illustrations further demonstrate that mail could be worn either independently or in combination with *chāhr-āyneh* (four-mirror armour). Some warriors are depicted wearing mail alone, while others are shown wearing mail together with *chāhr-āyneh*,[85] demonstrating that the two forms of protection could be combined when greater coverage was desired. In another depiction, a warrior is shown wearing *chāhr-āyneh* over a padded gambeson,[86] illustrating the variety of protective configurations employed by Persian warriors. These representations indicate that Persian armour was not governed by a single fixed combination of elements but could consist of different layers and components according to circumstance, preference, or military requirement.

Mail Armour Specimens with a Frontal Opening

Minor variations in ring size, rivet form and finishing may further assist in identifying workshop traditions or distinguishing between local manufacture and imported examples.

81 For examples of this style of Persian mail armour in a pullover style in Polish collections, see: Chodyński A.R. 2000, 216, 8, cat. 8, 218, cat 9, 220, cat. 17. For an example of a Persian mail armour in the Museum of Bern (Switzerland), see Zeller R., Rohrer E.F. 1955, table III, 54, fig. 11. For a riveted Persian mail armour of this style in the Military Museum of Shiraz, see: Moshtagh Khorasani M. 2006, 724, cat. 417; for another riveted Persian mail armour from the Military of Bandar Anzali, see: Moshtagh Khorasani M. 2006, 725, cat. 418. This type of mail armour is also shown in the famed Qajar-period painting titled "The Battle of Yerevan" that is kept in the National Museum of Iran, see: Moshtagh Khorasani M., Vladimirovich Gromov A.G. 2025, 214.

82 Esterābādi M.M.M. 1991.

83 Esterābādi M.M.M. 1991, 96, 147.

84 Esterābādi M.M.M. 1991, 147, 357.

85 Esterābādi M.M.M. 1991, 147, 216, 299, 357.

86 Esterābādi M.M.M. 1991, 253.

Mail Armour No. 1

The following is a *nimzereh* (literally 'half mail armour'), a type of Persian mail shirt that covers the torso and extends to half the length of the sleeves. It features a frontal opening secured by two clasps, which allow the two front halves to be fastened together and the armour to be closed securely. The clasp system is designed to hold two sections of the mail together. This clasp consists of two pieces of dark, polished copper. One piece is a rectangular tab with a slot in the centre, and the other is a slightly wider piece with a corresponding protrusion that fits into the slot. Both pieces are secured to the mail by two metal rivets each, their silvery heads providing a stark contrast to the darker copper. In addition, the mail armour incorporates a partial vertical opening at the centre of the back. This feature would have allowed the lower portion of the garment to spread slightly, facilitating greater freedom of movement — particularly lateral motion of the legs — an important consideration in mounted combat or dynamic footwork.

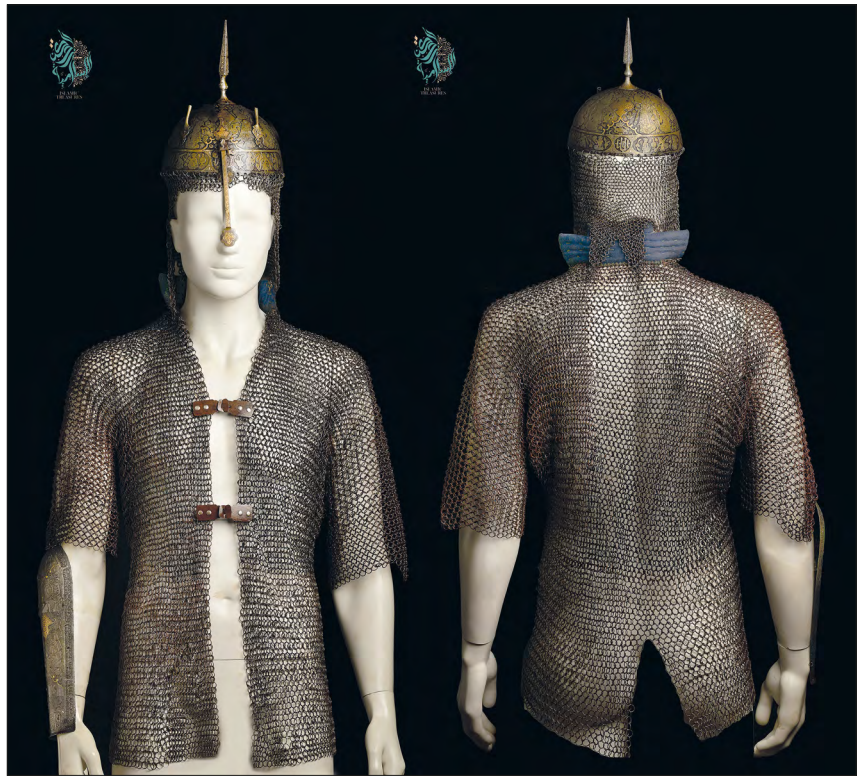


Fig. 1. The front and back sides of mail armour no. 1 (Photo: H.E. Alqarashi; author's picture collection)



Fig. 2. Fully riveted rings in mail armour no. 1 (Photo: H.E. Alqarashi; author's picture collection)

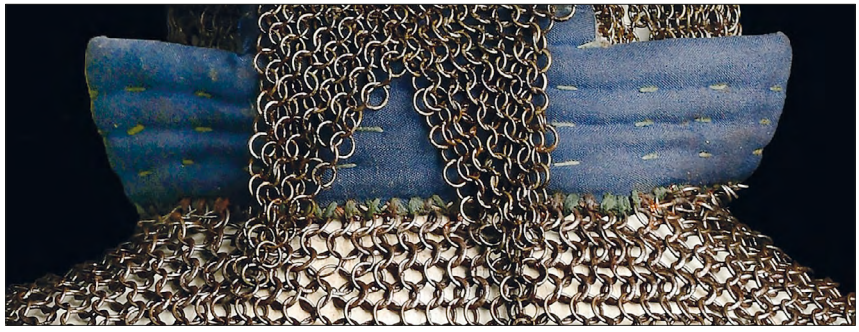


Fig. 3. *Garibān-e zereh* (collar or neck guard) of mail armour no. 1 (Photo: H.E. Alqarashi; author's picture collection)

The *garibān-e zereh* (collar or neck guard) of mail no. 1 is made of cotton and felt, dyed blue and attached to the upper edge of the mail. This padded collar provides comfort and protects the neck from chafing and impact. The mail wires are round in cross-section, with rounded rivet heads that lie flush against the ring surface. The armour is constructed in a 1-in-4 riveted ring pattern (each ring is interlinked with four others), and all rings are riveted — meaning no solid (punched or welded) rings are used throughout the entire garment.

Mail Armour No. 2

The second piece is likewise a *nimzereh* (half-mail armour), intended to protect the torso while extending over the upper portions of the arms. It is constructed of riveted mail, with each ring individually secured to enhance structural integrity and improve resistance to penetration.



Fig. 4. Mail armour no. 2 (Photo: H.E. Alqarashi; author's picture collection)

The armour features a frontal opening, fitted with two clasps and corresponding rings that allow the garment to be fastened securely while remaining relatively easy to don and remove. This practical closure system reflects a balance between protection and accessibility. The clasp system is designed to hold two sections of the mail together. This clasp consists of two pieces of dark, polished copper. One piece is a rectangular tab with a slot in the centre, and the other is a slightly wider piece with a corresponding protrusion that fits into the slot. Both pieces are secured to the mail by two metal rivets each, their silvery heads providing a stark contrast to the darker copper. In addition, the armour incorporates a partial vertical slit at the centre of the back. This opening enables the lower section of the garment to expand slightly, increasing flexibility and range of motion. Such a feature would have been particularly advantageous during mounted combat, facilitating ease of movement in the saddle, while also supporting agile manoeuvring on foot. The thoughtful integration of these structural elements demonstrates an awareness of both functional mobility and battlefield practicality, suggesting that the piece was designed not only for protection but also for sustained, active use.

The *garibān-e zereh* (collar or neck guard) is separately fashioned from layered cotton and felt, dyed a rich deep blue. This textile component not only cushions the neck and shoulders but also reduces chafing, demonstrating a practical consideration for prolonged wear.



Fig. 5. Neck guard of mail armour no. 2 (Photo: H.E. Alqarashi; author's picture collection)



Fig. 6. Riveted rings in mail armour no. 2 (Photo: H.E. Alqarashi; author's picture collection)

The mail itself is composed of rings drawn from round-section wire, each closed with neatly formed, rounded rivet heads, reflecting a high level of craftsmanship. The rings are arranged in the classic 4-in-1 linkage pattern, whereby each ring connects to four adjacent rings, producing a dense yet flexible protective fabric. Minor irregularities in the rings and rivets suggest hand-forging, while the contrast between the cool metallic mesh and the dark blue padded collar adds both functional and visual distinction. Overall, the piece achieves an effective balance between protection, flexibility and wearer comfort, making it suitable for both martial use and formal display.

Mail Armour No. 3

The third example represents a *nimzereh* (half mail armour), designed to cover the torso while extending partially over the upper arms. The armour features a frontal opening secured by three clasps that fasten the opposing edges, facilitating ease of donning and removal while maintaining a secure fit during use. Such closures are consistent with practical adaptations seen in Persian mail garments intended for active combat. The fastenings are made of a reddish-brown copper. Each clasp has a decorative, almost floral or wing-like shape, with a central raised stud or rivet. These decorative elements are asymmetrical and appear to be hand-forged, adding artistry to the functional armour. They are connected by a simple, robust hook and a ring. In addition, the armour incorporates a partial vertical opening at the centre of the back. This feature allows the lower portion of the garment to expand slightly, thereby enhancing freedom of movement — particularly for lateral leg motion — an important consideration for mounted combat as well as agile manoeuvring on foot.

The *garībān-e zereh* (collar or neck guard) is made from layered cotton and felt, dyed a subdued brown. This padded element would have served both to enhance wearer comfort and to mitigate abrasion, while also providing supplementary protection against blunt force and the pressure of the metal links.

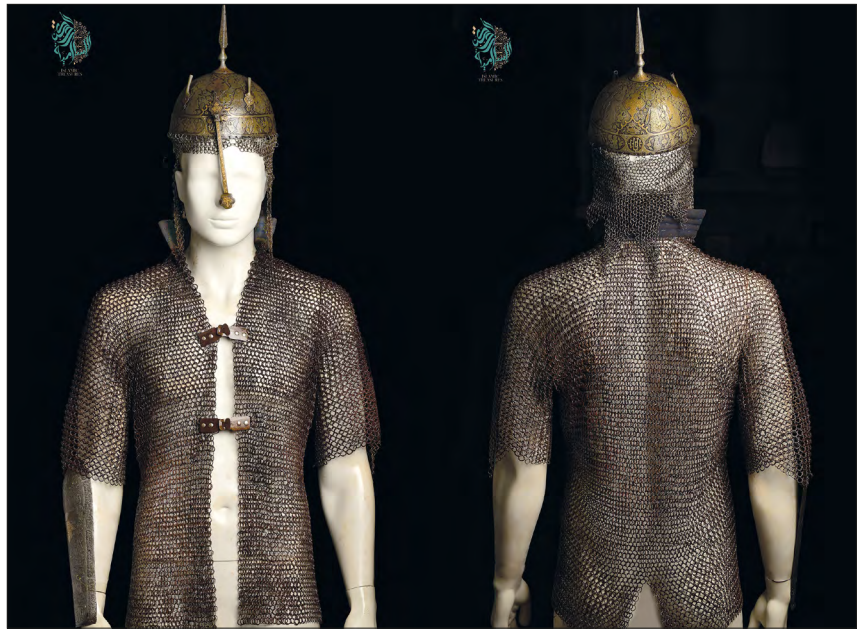


Fig. 7. Front and back views of mail armour no. 3 (Photo: H.E. Alqarashi; author's picture collection)

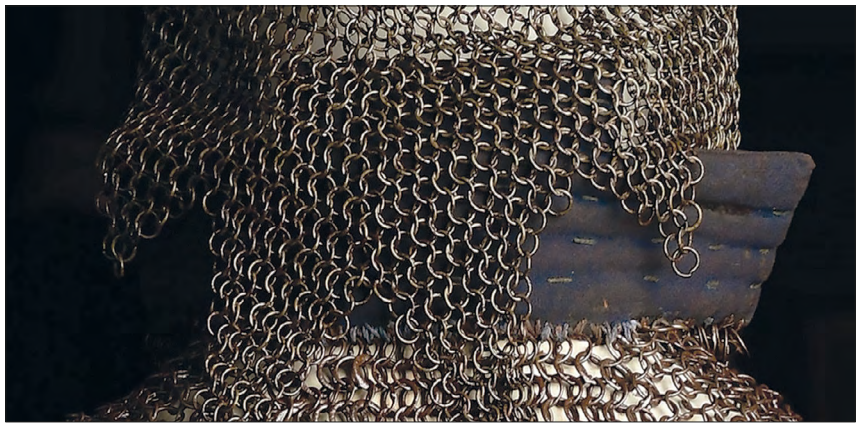


Fig. 8. Neck padding of mail armour no. 3 (Photo: H.E. Alqarashi; author's picture collection)



Fig. 9. Riveted rings in mail armour no. 3 (Photo: H.E. Alqarashi; author's picture collection)

The construction consists of riveted rings, reflecting a labour-intensive technique associated with high-quality mail. The individual rings are manufactured from round-section wire and joined with rounded rivet heads, a detail that may offer insight into regional production methods or chronological attribution. The mail is arranged in the classic 1-in-4 linkage pattern, in which each ring interlocks with four others, producing a flexible yet structurally resilient mesh.

Mail Armour No. 4

The fourth example of mail armour belongs to the second type of Persian mail, characterised by its pullover construction. This style is designed to be slipped over the head, similar to a traditional hauberk, and may provide slightly greater structural integrity due to the absence of a full-length frontal seam. This Persian *zereh* (mail armour)

is constructed from durable, riveted rings, forming a garment that balances protection with flexibility. The armour features a carefully designed neck opening, allowing it to be worn easily by pulling it over the head, and it includes long sleeves that extend protection to the arms. Although the armour is primarily of pullover design, it includes a short opening at the back and an additional frontal slit at the centre. These features likely facilitate easier dressing and ventilation without significantly compromising structural cohesion.



Fig. 10. A heavy mail armour with a pullover construction: mail armour no. 4
(Photo: H.E. Alqarashi; author's picture collection)

A notable feature is the *garibān-e zereh* (collar or neck guard), constructed from linen and integrated directly into the mail structure. In the neck area, linen elements are interwoven through the mail rings, reinforcing this particularly vulnerable zone while also improving wearer comfort by reducing friction and pressure against the skin. The interwoven section extends in a distinctive V-shape down the spine, reaching below the shoulder blades. This configuration not only enhances structural support in a high-mobility area but also helps distribute weight more evenly across the upper back. Additionally, the use of linen introduces a degree of flexibility and breathability, mitigating heat buildup and allowing for greater ease of movement without compromising protection.

The mail itself is composed of round-section wire rings with rounded rivet heads, arranged in a classic 1-in-4 linking pattern — one of the most widespread and historically effective methods of mail construction. This configuration ensures both strength and mobility, making it suitable for sustained use in combat.

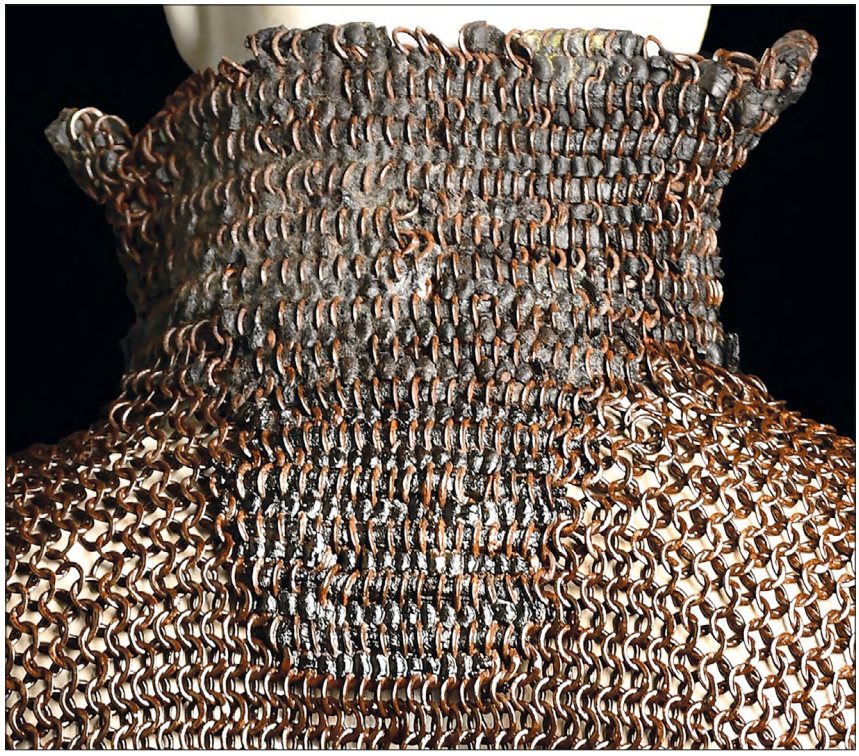


Fig. 11. Neck guard of mail armour no. 4 (Photo: H.E. Alqarashi; author's picture collection)

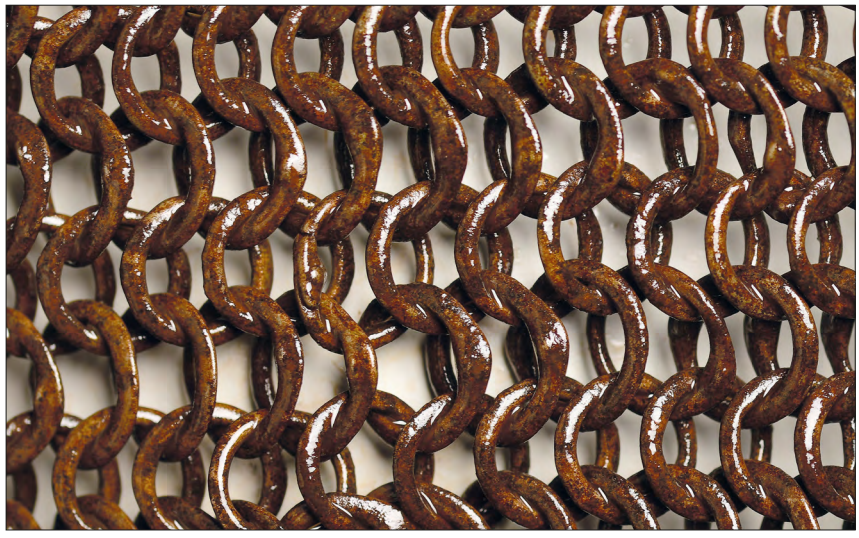


Fig. 12. Close-up of the mail rings in mail armour no. 4 (Photo: H.E. Alqarashi; author's picture collection)

The armour has a substantial weight of 13,510 grams (approximately 13.5 kg). This considerable mass can be attributed to two main factors: first, it is a full-length mail garment with long sleeves, providing extensive coverage; and second, the individual rings are notably thick and solid, contributing both to the armour's durability and its overall heaviness.

Overall, this piece exemplifies the craftsmanship and functional design of Persian mail armour, combining robust construction with thoughtful adaptations for comfort and wearability.

Mail Armour No. 5

This Persian *zereh* (mail armour) is constructed from robust riveted iron rings, forming a highly flexible yet resilient protective garment. The structure is carefully engineered to balance mobility with defence, allowing the wearer a wide range of movement while maintaining continuous bodily coverage. The armour features a reinforced neck opening that enables it to be donned by pulling it over the head, a characteristic feature of the second major category of Persian mail, distinguished by its pullover-style construction. Unlike mail coats with a full-frontal opening, this form presents an uninterrupted torso, which likely enhances structural stability by reducing weak points along a central seam. Long sleeves extend protection to the arms, integrating seamlessly into the body of the garment.



Fig. 13. Mail armour no. 5 with a reinforced neck opening (Photo: H.E. Alqarashi; author's picture collection)



Fig. 14. Neck protection consisting of two layers of riveted mail rings in mail armour no. 5 (Photo: H.E. Alqarashi; author's picture collection)



Fig. 15. Riveted mail rings in mail armour no. 5 (Photo: H.E. Alqarashi; author's picture collection)

At the upper section, the *garibān-e zereh* (mail collar or neck guard) consists of two closely set rows of interlinked rings layered above one another, reinforcing the most vulnerable area around the throat and upper chest.

The rings are manufactured from round-section wire and finished with rounded rivet heads, indicating a refined level of craftsmanship. They are assembled in a 1-in-4 linking pattern, a widely attested configuration in historical mail construction that increases both flexibility and resistance to penetration.

Although primarily a closed, pullover design, the armour incorporates subtle structural openings intended to ease wearability and improve ventilation without significantly compromising its defensive integrity.

Table 1. Dimensions and Weights of Mail Armour

Measurement	Mail no. 1	Mail no. 2	Mail no. 3	Mail no. 4	Mail no. 5
Shoulder to lowest part	64 cm	—	60 cm	75 cm	76 cm
Below armpit to lowest part	—	42 cm	40 cm	52 cm	55 cm
Length below *garibān* to back opening	52.5 cm	—	—	—	—
Neck protection to back opening	—	59 cm	40 cm	—	—
Neck to back opening	—	—	—	—	65 cm
Back opening length	18 cm	—	—	27.5 cm	—
Neck opening to front opening	—	—	—	34 cm	44 cm
Width armpit to armpit	—	57 cm	60 cm	—	61 cm
Width below armpit to front opening	26 cm	—	—	—	—
Shoulder to armpit width	—	—	—	22 cm	—
Midsection width	—	—	—	59.5 cm	—
Sleeve length	—	42 cm	40 cm	—	58 cm
Sleeve width	—	23 cm	—	—	19 cm
Arm width	—	—	15 cm	—	—
Neck protector to sleeve end	—	—	—	67 cm	—
Armpit to side length	41 cm	—	—	—	—
Weight	5570 g	5410 g	3980 g	13510 g	5610 g

Source: Author's own work
Note: — indicates that the measurement was not taken

Conclusion

The five mail armour specimens examined from the private collection in Qazvin provide a valuable and coherent sample for understanding the technical, functional and typological diversity of Persian *zereh*. Taken together, they demonstrate that Persian mail production was not uniform but instead reflected a sophisticated range of solutions adapted to different combat needs, levels of mobility and methods of donning. Across the corpus, two principal structural categories are clearly represented: frontal-opening mail shirts and pullover-style garments. The former prioritises practicality and ease of wear, especially when combined with layered textile padding or additional armour components, while the latter emphasises uninterrupted construction, which may enhance structural cohesion and reduce vulnerability along a central seam. The presence of both types within a single collection highlights the coexistence of alternative design philosophies in Persian armour-making traditions.

All five examples share key technological features characteristic of high-quality Persian mail: riveted iron rings made from round-section wire, rounded rivet heads and predominantly 1-in-4 (four-into-one) linkage patterns. These consistent construction principles indicate a strong continuity in technical knowledge and workshop practice, likely transmitted over long periods and across different production centres. Additionally, subtle variations in ring thickness, weight, finishing quality and textile integration suggest either multiple workshops or differing intended uses, ranging from functional battlefield equipment to potentially more formal applications. Particularly significant is the systematic incorporation of *garibān-e zereh* (neck protection), which appears in all five specimens in varying forms — ranging from padded cotton and felt collars to more structurally integrated linen-reinforced designs. This consistency underscores the recognised vulnerability of the neck and upper chest in mounted combat and reflects a well-developed protective strategy within Persian armour design.

Finally, the considerable variation in weight and construction density — from lighter, more flexible garments to heavier, densely riveted examples — further illustrates the adaptability of Persian mail to different tactical requirements, levels of protection and possibly social or ceremonial contexts. Overall, these five mail armours collectively highlight the technical refinement and adaptability of Persian armourers. They reflect a mature armour tradition in which functionality, ergonomics and protective efficiency were carefully balanced, confirming the important place of Persian *zereh* within the broader history of Islamic and Eurasian military material culture.

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