ANALYSING ARCHITECTURE AS A BASIS FOR RESTORATION DECISIONS

THE ZUIDERKERKSTOREN IN AMSTERDAM

PIETER VLAARDINGERBROEK

The restoration of the Zuiderkerkstoren in 2017 marked the end of the restoration of the Zuiderkerk (1603-1614). This striking tower, designed by Hendrick de Keyser (1565-1621), dominates the silhouette of the eastern part of Amsterdam's city centre and consists of a brick base, a sandstone octagon with flanking columns, and a wooden spire covered with lead and slate. The tower, which was last restored in 1978, was in need of complete restoration due to salt efflorescence in the brickwork and damage to the natural stone caused by rust. The lead cladding in particular was in need of renewal. In 1978, this lead work had been painted in a colour that resembled Bentheimer sandstone. The sandstone octagon, which until then had never been painted, was painted in the same colour (fig. 1). This change in the colour scheme was the result of the Department for Public Works' 'white tower plan', which had begun in 1966 with the painting of the Montelbaanstoren.[1] The aim was to paint all the lead claddings of seventeenth-century towers white, based on the belief that the white coating found on the lead covering of the towers was a remnant of an original finishing coat. Even when laboratory research showed that in the case of the Zuiderkerk this layer was a reaction product of lead and not a finishing coat, the tower was nevertheless painted on the pretext that this would demonstrate that the city was taking proper care of its heritage.[2]

◄ 1. The Zuiderkerkstoren in the colour scheme of 1978 (photo Han van Gool, Municipality of Amsterdam, Monuments and Archaeology)

◄ 2. The Zuiderkerkstoren after the restoration of 2017 (photo author)

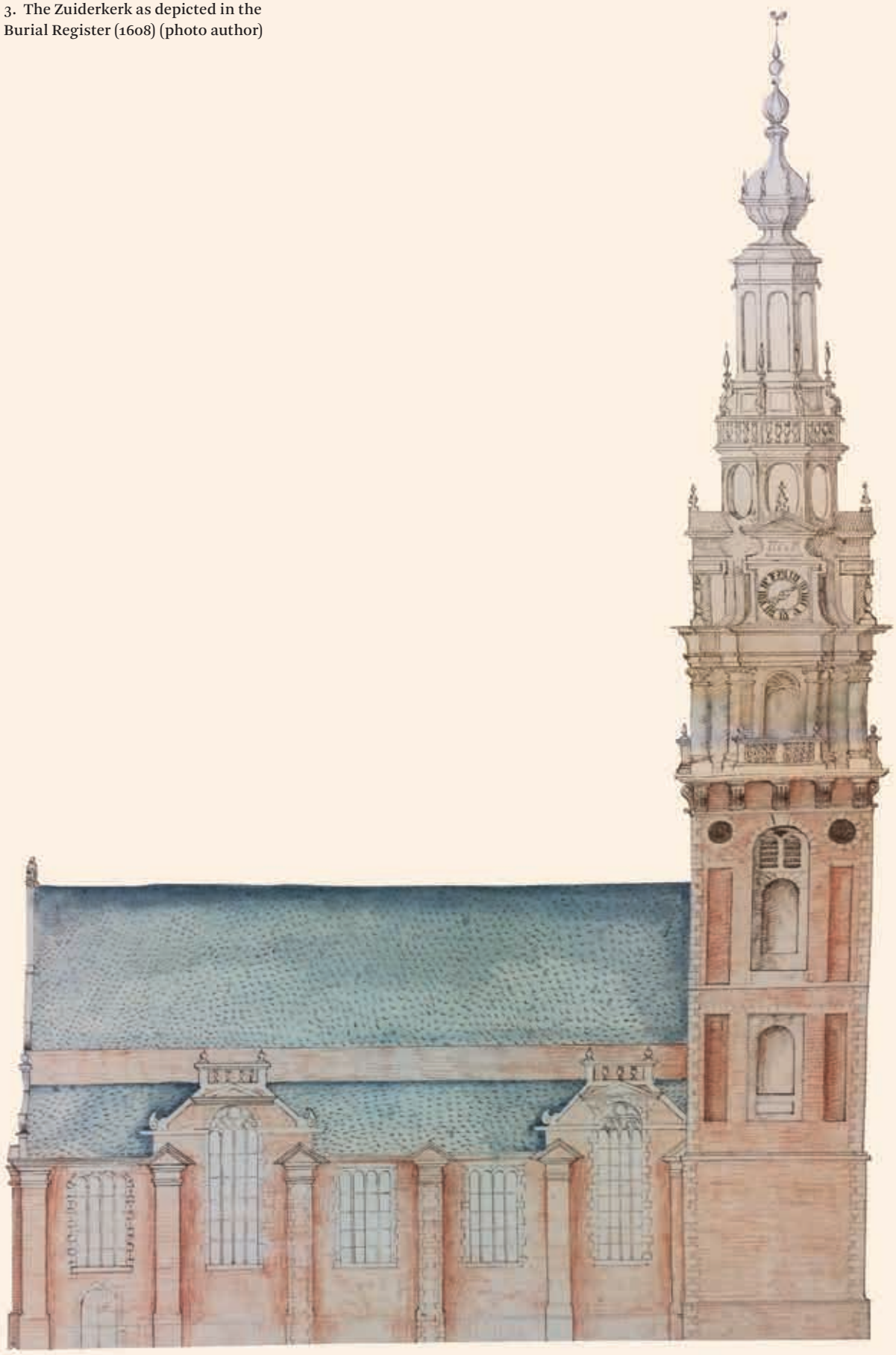
During the most recent restoration, which took place in 2015-2017, it became clear that most of the lead needed to be renewed, and the question arose as to whether the 1978 colour scheme should be maintained. Previous repainting had caused the tower's crown to turn a strange pale pink, which did not contribute to an appreciation of the architecture of the tower. Initially, Archivolt Architects suggested leaving the lead unpainted and painting the sandstone octagon of the tower in a matching blue-grey colour. This proposal was based on colour research, the available iconographic material and comparisons with other Amsterdam towers. However, an analysis of the Zuiderkerk tower and the tower design was lacking. Finally, in consultation with the architect and within the context of the heritage permit, the current colour scheme was chosen, in which the sandstone was painted in a sandstone colour while the lead retained its own dark colour (fig. 2). This scheme was the result of studying the tower from its construction until the present day, based on literature, archival sources, iconographic material, and construction and colour history research, supplemented by an analysis of the architecture of the tower, which ultimately played a decisive role. This article is a revised and amplified account of that analysis, which was carried out in 2016.[3] The example of the Zuiderkerkstoren shows how this classical method of architecture and design analysis, which is rarely used in restorations, can be useful in making the right restoration decisions.

THE FIRST NEW-BUILD PROTESTANT CHURCH IN AMSTERDAM

Relatively speaking, a good deal has been written about the Zuiderkerk. The church's construction history is discussed at length in the many city descriptions from the seventeenth and eighteenth centuries. The earliest (more) scholarly approach to construction history was that of C.H. Peters, who in 1901 described the establishment of the church on the basis of archival data.[4] The first monograph of the church, in which additional information was provided, was published in 1911 by G.D. Bom. His long history of the church was more about the religious use of the building than its architectural history. However, Bom was the first to refer to a 1608 architectural drawing of the church and tower, which was included in the Zuiderkerk's burial register (fig. 3).[5] All subsequent authors based their historical data mainly on these two authors and this article is no exception.[6]

The history of the Zuiderkerk is closely linked to the history of the city. In 1578, Amsterdam became a Prot-

3. The Zuiderkerk as depicted in the Burial Register (1608) (photo author)



estant city. This so-called Alteration had major consequences for the urban structure. All Catholic church buildings became Protestant. The monasteries that characterized the outskirts of medieval Amsterdam became the property of the city and their grounds and buildings were used to house some, though not all, of the city's growing population. Eventually the city had to expand in order to provide space for new houses and industries. During the 1585 expansion, the old city acquired a new 'ring' and the former fortification moats of Singel and Kloveniersburgwal became residential areas. However, this city expansion was relatively limited and the existing churches in the old city were still large enough to accommodate all the old and new residents of Amsterdam.[7] This changed with the expansion of 1593, when the industrial area called Lastage became part of the city. The construction of a new residential area around the Jodenbreestraat and the completion of the Vlooienburg district made the east side of city so much larger that the construction of a new church had to be considered as well.[8]

In 1602, it was decided to build the Zuiderkerk, which would not only serve as a church but also provide the community with a much-needed new cemetery. The city council expected to be able to build the church cheaply, because there was an abundance of building materials. The medieval city walls, which were no longer necessary due to the city expansions, were to be demolished, releasing a large quantity of bricks. Because there was no place to store them, their immediate reuse in a new building was also seen as a cost saving. In addition, foundation piles were cheap and readily available, according to the city council's resolution of 1 June 1602.[9]

Construction of this three-aisled pseudo-basilica, designed by Hendrick de Keyser, started in 1603. The foundations were laid, after which construction was halted for several years due to urban cutbacks. After work resumed in 1607, the sandstone window sills of the side aisles were installed and in 1608 the building was roofed over. It was not until 1611 that the church was completed. The 237-foot tower was completed in 1614, as evidenced by the date above the dials.[10] The bells in the church tower served not only to summon the faithful, but also as city clocks for this part of the city. The tower, and in particular the crown, is clearly visible from a large part of the city. The tower stands on the axis of Groenburgwal, but is also visible from Jodenbreestraat, as well as from various points along Kloveniersburgwal and Oude Schans and from Vlooienburg.[11] Owing to this pursuit of maximum visibility, the tower was not placed on the main axis of the church, but on a corner of the southern bay of the left (western) side aisle. The church's other important function was the ringing of the bells at church services and funerals. In order to ensure that the sound was clearly audible in the surrounding area, the belfry openings were located above the roofline of the church and thus also above the roofline of the surrounding houses.

THE DESIGN OF THE TOWER

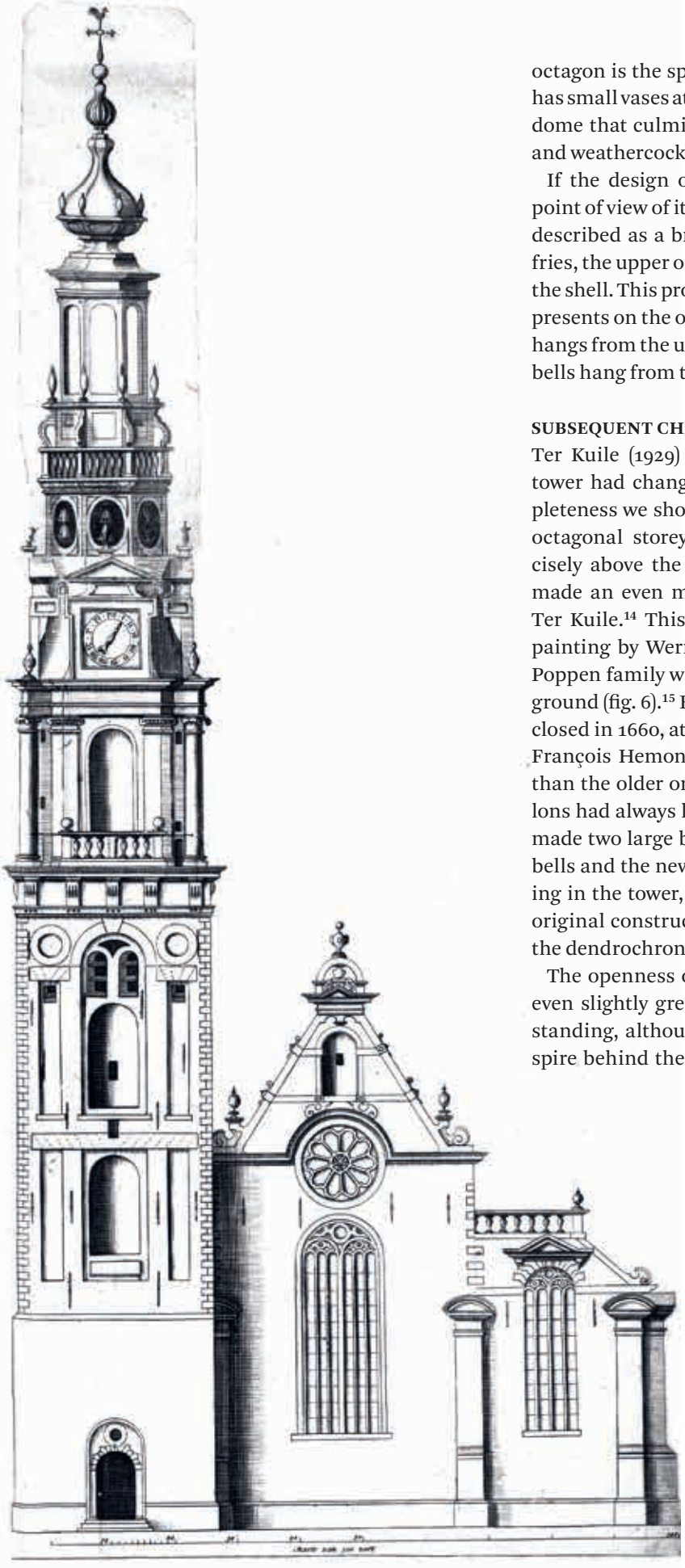
The urban setting clearly influenced the design of the tower. The design itself was published in *Architectura Moderna* by Salomon de Bray (1631) (fig. 4).[12] The base has a square floor plan; it consists of brick with sandstone quoins and has three storeys separated by string courses. The upper two storeys have comparatively more sandstone around windows, doors and niches than the lower part.

Because the tower was quite built-in, the lower 32 feet were left flat, with the exception of the tower entrance, which was placed in a niche. On the floor above there are three recesses: two narrow rectangular ones at the sides and an arched one in the middle. The top storey of the brick base has a similar layout of two narrow rectangular niches either side of an arched niche. The belfry openings are at the top of this arched niche. Together the niches and belfry openings have the form of a Palladian window or serliana; next to the arch there are two round niches. The most visible part of the tower base is the top storey; much of the lower two storeys is hidden from view by the surrounding buildings.

The dimensions of the narrow niches of the middle and top storeys of the brick base are identical in the print. The same applies to the arched niches, which correspond in size to the niche around the entrance. The base is terminated by a Doric cornice with consoles, on which, in the middle of every side, there is a sandstone railing with balusters.

The brick base is topped by a sandstone octagon which is flanked on the chamfered corners by Ionic sandstone columns which are connected to the octagon by means of cornices. The columns are crowned by vases. The corners of the octagon have Ionic pilasters with alternately wide and narrow spacing, which form a rhythmic bay and therefore have the same rhythm as the serlianas in the brick base. In the wide central bay there are arched niches that correspond in size to the niches of the brick base; in the chamfered corners there are small openings between the pilasters. On the cornice above these niches there are four clock dials made of lead-lined oak, crowned by a pediment.

Behind these clocks is the octagonal crown of the tower, clad with lead and slate, consisting of a wider and a narrower octagon. Above the lower octagon there is a balustrade with 'flying buttresses', on which vases are placed. At the top of the upper and narrower



4. The tower as depicted in the *Architectura Moderna* by Salomon de Bray (1631) (Utrecht University Library)

octagon is the spire with a closed onion dome, which has small vases at the corners, and an open-work onion dome that culminates in a sphere with a tower cross and weathercock.

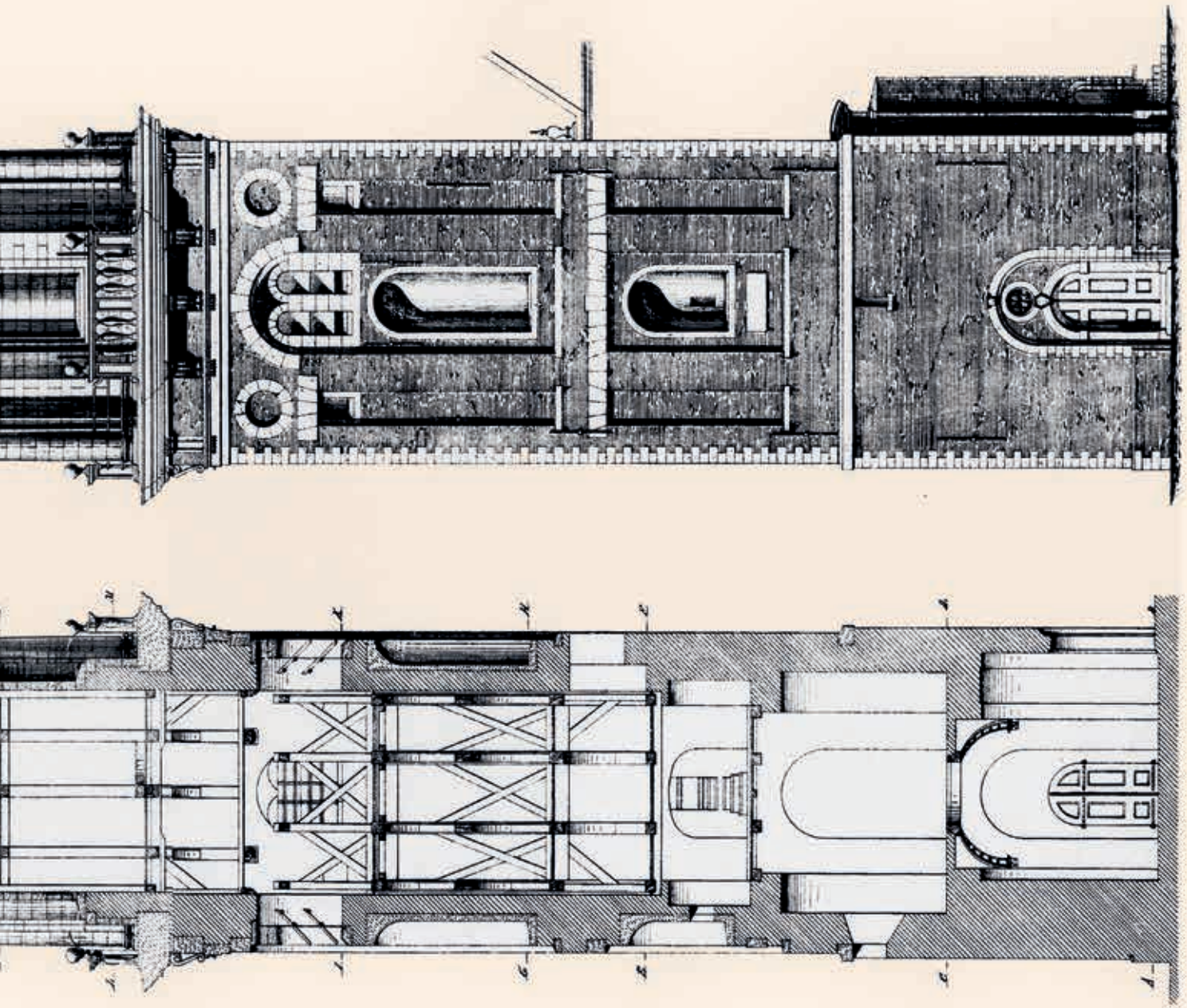
If the design of the tower is considered from the point of view of its internal structure, the tower can be described as a brick and stone shell around two belfries, the upper one of which partially protrudes above the shell. This protruding part is covered with lead and presents on the outside as a spire (fig. 5).[13] The carillon hangs from the upper belfry, while the heavy swinging bells hang from the lower one.

SUBSEQUENT CHANGES

Ter Kuile (1929) and Bijtelaar (1947) noted that the tower had changed over time. 'For the sake of completeness we should also mention that the now blind octagonal storey originally had oval openings precisely above the dials, so that the whole must have made an even more transparent impression,' writes Ter Kuile.[14] This open structure is visible in a 1620 painting by Werner van der Valckert, portraying the Poppen family with the Zuiderkerkstoren in the background (fig. 6).[15] Bijtelaar mentions that the ovals were closed in 1660, at the same time as the new carillon by François Hemony was installed in a higher position than the older one. The three previous, smaller carillons had always hung in the open ovals. Hemony also made two large bells for the tower.[16] Because the new bells and the new carillon increased the weight hanging in the tower, additional braces were added to the original construction for safety reasons, as shown by the dendrochronological survey conducted in 2017.[17]

The openness of the tower's exterior was originally even slightly greater. Even the dials used to be free-standing, although their tops were connected to the spire behind the pediment. This is visible in Van der

1634



5. T. Brouwer, view and cross-section of the Zuiderkerkstoren (1870), as depicted in W.N. Rose (ed.), *Afbeeldingen van oude bestaande gebouwen, uitgegeven door de Maatschappij tot Bevordering der Bouwkunst*, Haarlem/The Hague 1852-1875 (City Archives Amsterdam, editing author)

6. Werner van der Valckert, Let the little children come to me. Michiel Poppen and his family, 1620 (Utrecht, Museum Catharijneconvent)

Valckert's painting, as well as in the print in *Architectura Moderna* (fig. 7). It can also be seen in the oldest image of the church tower from 1608 in the form of the hatching that indicates shadow. Proof of the presence of these openings behind the hour hands is provided by the tower itself, where the roof boarding to which the slates used to be attached is still present together with a few slates.[18]

MAINTENANCE

The tower has been restored several times over the centuries. The archives of the City of Amsterdam and of the Reformed Church give some idea of the maintenance that was carried out on the building. For example, it is known that the bricklayer Coenraad Hoeneker was involved in the church's maintenance from 1741 onwards.[19] In 1755 he declared 5,341 guilders and 17 stivers.[20] In 1756-1757, Hoeneker declared an amount of 3,838 guilders, which, given the normal annual amounts of around 400 guilders, suggests a major maintenance operation. A total of 58,157 guilders and 17 stivers was spent on the maintenance of the church in the period 1753 to 1757.[21] Presumably the church and the tower were then encased in scaffolding and partly provided with a new brick facing, as can be seen from the relatively large areas of eighteenth-century masonry with the characteristic purplish colour. In 1778-1780, the painter B. Hartman was paid the considerable sum of 1,789 guilders and 15 stivers, which again points to extensive works.[22] In 1802 a substantial leak due to neglect of the tower was discovered. Much plumbing and slating work was carried out, 'the lead having slid off the slope of the upper cornice and the slates having fallen off some of the shields.' It was reported that there was little that could be done to rectify this without scaffolding.[23] In 1884 the sandstone

7. The interrelationship of parts in the brick and stone sections of the tower. The blue-coloured areas indicate the air that used to flow behind the dials (adaptation of fig. 4 by the author)

parts of the church and the lower part of the tower were painted, including the sandstone balustrade in front of the sandstone octagon.[24]

In 1938, a concrete floor was laid above the bells, while in 1940-1941 the posts of the belfry were repaired. The stonework was also repaired.[25] In 1940, a note referring to works carried out in 1860 was found; it is possible that it was then that the sandstone Ionic capitals of the tower were replaced by the current cast-iron ones. In 1968, 1977-1978 and 1997 the tower was repaired again.[26] Despite the frequent maintenance, the appearance of the tower did not change substantially.

THE COLOUR SCHEME OF THE TOWER UP UNTIL THE RESTORATION OF 2017

What did change over the centuries, however, was the colour scheme of the Zuiderkerkstoren. The ageing of materials and in particular the darkening of the sandstone meant that by the late seventeenth century the colours of the church tower must already have looked different compared with immediately after construction. Roughly speaking, there have been three colour phases up until the last restoration: the original tower (1614); the weathered tower (c. 1660-1978); the painted tower with the light top (1978-2017) (fig. 8).

COLOUR PHASE 1 (1614)

The original colour scheme (1614) of the tower cannot be reconstructed with one hundred per cent certainty. The red brick base has an increasing amount of sandstone towards the top. According to the colour study of 2016-2017, the sandstone octagon on top of the brick base was originally unpainted.[27] It had its own sandstone colour, while the areas of lead had a darker appearance. Only the frames of the dials, made of lead-clad wood, were painted in a sandstone colour to match the sandstone octagon. Remarkably, during the last restoration, traces of gilding were found behind the lead cladding and on the original oak wood of the dials, as well as painted numerals of the year 1614. This suggests that (part of?) the lead cladding on the dials must have been applied sometime after their construction and that the dials were initially finished only with a coat of paint.

Only one image of this first colour phase is known, namely the aforementioned painting by Werner van der Valckert (1620). In this painting the vases are painted in the same colour as the architectural setting in which they stand: the large, sandstone-coloured vases at the bottom, the smaller dark (lead-coloured) ones at the top. The weathercock, the cross and the sphere on top of the tower seem to have been gilded.

8. The three colour phases of the Zuiderkerkstoren up until the last restoration and the current colour scheme. The original colour scheme as depicted in the painting by Werner van der Valckert from 1620 (detail from fig. 6); the darkened phase as seen in a painting by Jan de Beijer from 1758 (Amsterdam Museum) and in a photo from c. 1870 (photo A. Jager, City Archive of Amsterdam); the Zantkuijl phase from 2008 (photo Han van Gool, City of Amsterdam, Monuments and Archaeology) and the current situation (photo Paul Nieuwenhuizen, City of Amsterdam, Monuments and Archaeology)

COLOUR PHASE 2 (CIRCA 1660-1978)

The spire lost some of its original transparency when the ovals were closed. The holes were filled in with wooden panels, which were covered with slates. In addition, the sandstone darkened due to the natural process of weathering and pollution. This gave the sandstone octagon a greyish appearance, which matched the colours of the lead and slatework of the octagonal spire. In terms of colour, this made the sandstone octagonal blend with the spire. As a result, the colour composition shifted in relation to the original situation. This was reinforced by the fact that the sandstone of the brick section and the sandstone balustrade at the level of the sandstone octagon had been painted in a light colour in the eighteenth and nineteenth centuries. Archival evidence for this dates from 1884, when the stone parts of the church were painted, as well as 'the balustrade with the painted stone' of the tower.[28] The dials were also painted several times, as evidenced by the inscriptions the painters left behind in the tower. The vases were all painted blue and partially gilded. Weathercock, cross and sphere were gilded. This colour scheme can be seen in Jan de Beijer's 1758 painting, which is in the Amsterdam Museum. Broadly speaking, this colour scheme did not change until 1978.

COLOUR PHASE 3 (1978-2017)

In 1978 the colour scheme of the tower was studied by the head of the Amsterdam's Heritage Office, Henk Zantkuijl, who thought he detected a light-coloured finishing coat on the tower. However, laboratory research later revealed that the coating observed by Zantkuijl was of lead oxide rather than a coat of paint. Nevertheless, the tower was painted in accordance with the Public Works Department's 'white tower plan', whereby the lead was painted in a light Bentheimer sandstone colour, resulting in a different colour scheme.[29] The sandstone octagon, which had aged considerably over the centuries, was painted in a light colour, so that it resembled the original sandstone again. The red dials were retained, as were the blue vases. The lead of the spire was painted in the same light colour, creating a contrast with the parts covered with slate.

ANALYSIS OF THE TOWER'S STRUCTURE

Zantkuijl's colour proposal was consistent with, and perhaps even stems from, his vision of the architectural structure of the tower: 'The tower consists of two parts, namely the square brick tower and the pointed crown.'[30] This view of a twofold division, which in the literature is shared only by Von der Dunk, was initially

adopted by the restoration architect Archivolt.[31]

Other authors, however, see a threefold division, consisting of a brick base, a stone connecting member (the octagon) that functions as a transition zone, and a spire. Ozinga (1929) analyses the tower as follows in his *Protestantsche kerkenbouw*: 'Its flat-surfaced base, without buttresses, passes over a strongly accentuated cornice by means of diagonally placed freestanding columns into a Bentheimer stone octagon, which carries one of the most characteristic Amsterdam wooden spires of our time.'[32] Later authors, including Neurdenburg, Vermeulen, Ter Kuile and Ottenheym/Rosenberg/Smit, took the same view.

Despite the fact that a formal description of the tower often leads to a threefold division, the question can be asked whether this is correct. Isn't a twofold division, as perceived by Zantkuijl, more accurate? In answering this question, it is essential to look at where the base of the tower ends, and the spire begins. In my opinion, the stone octagon is not part of the spire, but part of the tower. An analysis of the tower design suggests a separation between base and spire above the level of the stone octagon with clocks. The series of semi-circular recesses on both parts provide the connection between the stone part of the tower and the brick base. The stone octagon itself (minus the columns) consists of alternating narrow and wide bays, occupied by semi-circular niches set in flat niches. These flat niches are as the same size as the semi-circular niches in the brick base. The narrow niches of the serlianas in the brick base are the same width as the Ionic columns. In light of these dimensions, it seems feasible to conclude that the stone octagon is the crowning glory of the brick base and that the design of the base is very similar to this. The dimensions suggest that the stone octagon has a strong affinity with the brick base, justifying the proposition that these two parts form a whole (fig. 7).

There is another, perhaps even more important, reason to see the sandstone octagon as the termination of the brick tower rather than as part of the tower crown. Despite the absence of columns, the brick base can be classified as Doric because of the cornice. De Keyser's use of the Ionic order in the sandstone octagon can therefore be seen as conforming to the classical rules governing superposed orders. The spire above it, which is essentially a lead-clad belfry that inclines towards a pointed crowning of the tower, is without classical orders, which makes sense from the standpoint of classical architectural theory. The logic of classical order theory dictates that the tension is transmitted vertically and perpendicularly, symbolized in particular by the columns.[33]

THE CURRENT COLOUR SCHEME

The analysis of the architecture and the study of the historical sources have led to the current colour scheme. The new leadwork is not painted, but patinated to inhibit oxidation. As a result, the lead will retain its dark colour for a longer period of time. The stone parts of the base of the tower, including the sandstone octagon, are painted in a Bentheimer sandstone colour. This new coat of paint was inevitable as it was not possible to remove the coat of paint applied in 1978 without damaging the stone. Moreover, the natural ageing of the Zuiderkerkstoren, the patina, had already been lost.[34]

The decision in favour of the original colour scheme, made at the instigation of the Amsterdam heritage department, is also related to the appreciation of the various colour schemes over the centuries. The original colour scheme does most justice to the architecture of the tower. Because the later colour phases had reduced the legibility of the tower design and because the tower and the church still manifest the original design, the choice of the original colour scheme was justified.

CONCLUSION

When the City of Amsterdam declared the later alterations to the tower subordinate to the original concept in 2017, this paved the way for the restoration of the original and very distinctive colour scheme of the Zuiderkerkstoren, namely a base of red brick and pale yellow Bentheimer sandstone topped by a darker, lead-covered spire with gilded elements. There has been remarkably little criticism of this decision to date, whereas the far less radical changes to the colour scheme of the Westerkerstoren in 2007 led to a good deal of commotion. It would seem that the current appearance of the Zuiderkerkstoren carries conviction, which is probably due to the fact that the chosen colour scheme is the outcome of an approach in which architectural history, building history and colour history all played a role.

Within the architectural-historical approach, the architectural analysis was decisive. This consideration of the architecture, which focused on the design and the intended effect, is only very rarely an object of study in Dutch heritage circles. Research into the construction and colour history predominate, probably because those methods often produce a (supposedly) factual account that heritage specialists and architects readily cling to. The case of the Zuiderkerkstoren shows that in some instances an analysis of the architecture is indispensable because it can provide insight into the design and significance of a building and in so doing help resolve restoration issues. This will be most

effective in the case of buildings that have survived the passage of time relatively unscathed and in which the original concept still holds sway. In buildings that have been radically altered or have a valuable patina, reinstatement of the original (colour) concept will be much less self-evident. It is to be hoped that this article will encourage the adoption of this method in other cases within the context of an interdisciplinary approach.

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NOTEN

1 J.B. Visser, 'Het witte torenplan van Publieke Werken', *Ons Amsterdam* 19 (1967), 12-14.

2 W.F. Denslagen and A. de Vries, *Kleur op historische gebouwen. De uitwendige afwerking met pleister en verf tussen 1200 en 1940*, The Hague 1984.

3 P. Vlaardingerbroek, *Zuiderkerkstoren, architectuur en kleur door de eeuwen heen*, unpublished report, City of Amsterdam, 25 January 2017.

4 C.H. Peters, 'Protestantsche Kerkgebouwen. De Zuider-, Wester- en inzonderheid de Noorder-kerk te Amsterdam, tevens eene bijdrage tot de geschiedenis van het Fabriek-ambt aldaar', *Oud Holland* 19 (1901), 145-168 and 198-231.

5 G.D. Bom HGz., *De Zuiderkerk te Amsterdam, de eerste nieuwgebouwde kerk der hervorming in Nederland. Geschiedkundig overzicht van den bouw van, en den dienst in deze kerk, alsook van haren toren en haar kerkhof, van 1600 tot heden*, Amsterdam 1911. The design for the church can be found in Stadsarchief Amsterdam (SAA), archive 378.ZK (Zuiderkerk), inv. no. 33.

6 Later authors are: M.D. Ozinga, *De Protestantsche Kerkenbouw in Nederland. Van Hervorming tot Franschen tijd*, Amsterdam 1929; E.H. ter Kuile, *De houten torenbekroningen in de Noordelijke Nederlanden*, Leiden 1929; E. Neurdenburg, *Hendrick de Keyser. Beeldhouwer en bouwmeester van Amsterdam*, Amsterdam [1930]; F.A.J. Vermeulen, *Handboek tot de geschiedenis der Nederlandsche bouwkunst*, vol. II, The Hague1931, 371-373; I.H. van Eeghen, 'De wording van de Zuiderkerk', *Maandblad Amstelodamum* 45 (1958), 193-197; H.J. Zantkuijl, *Bouwen in Amsterdam. Het woonhuis in de stad*, Amsterdam 1993 (no. 20: 1977[1]) 174-175; K. Ottenheym, P. Rosenberg and N. Smit, *Hendrick de Keyser Architectura Moderna. Moderne bouwkunst in Amsterdam 1600-1625*, Nijmegen 2008; J.E. Abrahamse, *De grote uitleg van Amsterdam. Stadsontwikkeling in de zeventiende eeuw*, Bussum 2010, 37-40; T.H. von der Dunk, *Toren versus traditie. De worsteling van classicistische architecten met een middeleeuws fenomeen*, Leiden/Amersfoort 2015, 112-113, 131-133.

7 S.A.C. Dudok van Heel, *De jonge Rembrandt onder tijdgenoten. Godsdienst en schilderkunst in Leiden en Amsterdam*, Nijmegen 2006, 19-23.

8 For the Amsterdam city expansions see: Abrahamse 2010 (note 6).

9 Dudok van Heel 2006 (note 8), 22. See also SAA, archive 5025 (Vroedschap), inv. no. 8, fol. 860 (1 June 1602): 'Ende deurdien men tegenwoordich besich is, met het affbreecken van de reste van dese stede oude muijren, daervan veel steen is commende, *ende* weinig bequame plaetse te becommen is om d'selve te logeren, dat ons *ver*staen word dat de heijpalen nu wel te becommen ende zeer goetcoop zijn, *ende* andere consideratien, hebben burgerm*eesteren ende* xxxvi raden goet gevonden *ende* geresolveert, dat men het fundament van de *voor*sz gedestineerde kercke metten eersten sal doen heijen, *ende* ophalen, *ende* dat de steen van de *voor*sz muijr commende (voor soo veel aen*den* kercke van node sal wesen) binnen het voorsz geheijde pleijn sal worden gebracht.'

10 Peters 1901 (note 5), 150-153; Bom 1911 (note 5).

11 Abrahamse 2010, 40 (note 7).

12 Salomon de Bray, *Architectura Moderna ofte bouwinge van onsen tijt*, Amsterdam (Cornelis Danckerts van Seevenhoven) 1631, print I. The built base of the tower is slightly different from the tower as depicted in *Architectura Moderna*. The second storey was lower in reality than in the print.

13 The construction with two separate belfries is clearly visible in SAA, archive 10057 (Centraal Tekeningenarchief), inv. no. 18410; see also the print by Jan Brouwer: SAA, figs. nos. 010056919087 and 010056919088.

14 Ter Kuile 1929 (note 7), 81; E.H. ter Kuile, *De torens van Nederland*, Amsterdam 1943, 94-95.

15 Denslagen/De Vries 1984 (note 3), 54, 72.

16 B. Bijtelaar, *De zingende torens van Amsterdam*, Amsterdam 1947, 110-122. See also SAA, archive 5025, inv. no. 21, fol. 34 (2 december 1655): invitation to François Hemony to settle in Amsterdam, with free housing and workshop, in order to cast 'de Clocken, zoo groote als cleijne van de Oude Kercx, Suijder en Wester en*de* andere toorens te laten vergieten'. The Burgomasters adopted the resolution: SAA, archive 5039 (Thesaurieren Ordinaris), inv. no. 1, fol. 167 (10 December 1655). See also the resolution to have watchmaker Jurriaen Sprackel rehang the bells and the mechanical carillon drum: SAA, archive 5039, inv. no. 2, fol. 13-13v (11 October 1657).

17 Dendrochronological analysis B. Heussner, Petershagen, 3 April 2017: Zandstraat 17 (Zuiderkerkstoren), sample AMZS17-8, carillonneur's room: oak, c. 1631; Zandstraat 17 (Zuiderkerkstoren), sample AMZS17-9, carillonneur's room: oak, 1655 c. 10 years.

18 Visual observation author, 2017.

19 SAA, archive 378.ZK, inv. no. 12.

20 B. Bijtelaar, *Geschiedschrijving over de Zuiderkerk*, typescript, Amsterdam 1975, 24.

21 Bijtelaar 1975 (note 21), 24-25.

22 SAA, archive 378.ZK, inv. no. 13.

23 SAA, archive 5040 (Stadsfabriekambt en Stadswerken en Stadsgebouwen), inv. no. 93, 346-347 (4 March to 8 April 1802).

24 SAA, archive 378.ZK, inv. no. 104.

25 Bijtelaar 1947 (note 17), 119.

26 Petra van Diemen, *Zuiderkerkstoren Amsterdam*, unpublished report (0836_memo kleuren architectuurhistorisch.docx), Amsterdam 2017, 22.

27 J. Tegelaar, *Toren Zuiderkerk te Amsterdam. Een verkennend kleuronderzoek naar de oorspronkelijke afwerking*, unpublished report on historical paint layers, Aalsmeer 2017. The results of this research confirm recent theories as to how sandstone was finished. In the case of the Amsterdam town hall the facade stone was never painted; the same seems to be true of Amstel 216 in Amsterdam. See P. Vlaardingerbroek, 'Ongeverfde natuursteen als uitdrukking van een ideaal. De gevels van het Paleis op de Dam historisch benaderd', *Maandblad Amstelodamum*, 95 (2008), 3-12. A source from 1772 appears to confirm this: the Amsterdam city architect J.E. de Witte advised using sandstone from Gildehaus instead of Obernkirchener sandstone, because he thought it would retain its pale colour for longer; see SAA, archive 5040, inv. no. 27 (7 October 1772 under no. 21). Until recently, there was a general belief that sandstone was always painted.

28 SAA, archive 378.ZK, inv. no. 104.
29 See note 2.
30 H.J Zantkuijl, 'Schilderwerk Zuiderkerkstoren', typescript 1978 (City of Amsterdam, Monumenten en Archeologie, archive).
31 Von der Dunk 2015 (note 7), 131. However, on page 133 Von der Dunk implies that there may be a threefold division. Ter Kuile 1929 (note 7), 81 also seems to suggest a division into two parts but also notes that 'it [is] not easy to say where the spire proper of the tower commences'.
32 Ozinga 1929 (note 7), 30-31.
33 See also Von der Dunk 2015 (note 7), 187-190. This way of designing – a brick base and a tapering top – is typical of De Keyser, as is also evident from the original, but unexecuted design of the Westerkerk tower. Here a brick base is followed by a stone section with Doric columns topped by a spire without classical orders. This spire is also designed as a belfry covered with lead, protruding from the brick and stone tower base and intended to hold the carillon of the Westerkerk.The present top dates back to 1638 and is often (wrongly) regarded as classical because of its superposition of Ionic and Corinthian orders (see J. de Heer, *Het architectuurloze tijdperk. De toren van Hendrick de Keyser en de horizon van Amsterdam*, Amsterdam 2000, 61-62; Ottenheym/Rosenberg/Smit 2008, 67-68, note 7; Von der Dunk 2015, 138, note 7). The superposition of the orders may be correct, but the placement of the columns, which do not stand directly on top of one another, is not, and it is also contrary to De Keyser' design method.
34 P. van Diemen, 'Restauratie van de Zuiderkerkstoren', *Binnenstad. Uitgave van de Vereniging Vrienden van de Amsterdamse Binnenstad* 51 (2017), 60-62.

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ARCHITECTURAL ANALYSIS AND RESTORATION

THE TOWER OF THE ZUIDERKERK IN AMSTERDAM

PIETER VLAARDINGERBROEK

In 2017, the restoration of the Zuiderkerk (1603-1614) was completed with the renovation of its tower. This striking tower, designed by Hendrick de Keyser (1565-1621), dominates the silhouette of the eastern part of Amsterdam's city centre. It consists of a brick base, a sandstone octagon with columns and a wooden spire clad in lead and slate. The tower, which was last restored in 1978, was in need of a complete restoration due to salt efflorescence in the brickwork and rust damage to the natural stone. In addition, the lead of the spire needed renovation. The lead had been painted in a Bentheimer stone colour in 1978, as was the sandstone part of the tower. This change in the colour composition was a result of the 'white tower plan' of the Public Works Department, which had started in 1966, when the Montelbaanstoren was painted white. The aim was to paint all lead claddings of seventeenth-century towers white, based on the idea that the white layer found on the lead cladding of the towers was a remnant of an original finish. When laboratory analysis showed that in the case of the Zuiderkerk this layer was the product of a chemical reaction in the lead and not a finishing coat, painting nevertheless continued, on the grounds that this would show that the city was looking after its heritage.

When the most recent restoration of 2015-2017 showed that most of the lead needed to be renewed, the question arose as to whether the 1978 colour composition should be maintained. Subsequent painting had caused the crown of the tower to turn a strange pale pink, which did nothing to improve the appearance of the tower architecture. Initially, the Archivolt firm of architects proposed leaving the lead unpainted and painting the sandstone octagon of the tower in a matching blue-grey colour. This proposal was based on historical colour analysis, the available iconographic material and comparisons with other Amsterdam towers. However, an analysis of the tower and the tower design was lacking. Finally, in consultation with the architect, the current colour scheme was chosen, in which the sandstone was painted in sandstone colour and the lead retained its natural dark colour, resulting in a tower with a clear colour contrast. The justification for this was provided by studying the history of construction and alterations found in literature, archival sources, iconographic material, building and historical colour research. This was supplemented by an analysis of the architecture of the tower, which ultimately played a decisive role. This article is a reworking of and addition to the analysis carried out in 2016. The example of the Zuiderkerkstoren shows how this classical method of architecture and design analysis, which is rarely used in restorations, can be helpful in deciding on the correct type and degree of restoration.