# Historical pointing and the preservation of its value

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## Abstract

Pointing plays both a technical (protective) and an aesthetical role within a wall. Pointing in monuments also possesses a historical, documentary value. Its value and its significance need to be clarified in view of a restoration.

The aim of this work is to propose criteria and guidelines to carry out not only technically, but also historically and aesthetically well-considered conservation and restoration activities, thus preserving the value of the pointing within its cultural context.

A history of pointing is meant to form the documentary background to evaluate cases of re-pointing. Criteria such as 'authenticity', 'homogeneity', 'durability' are discussed in relation to the preservation of the value of pointing.

Well-considered restorations should take into account both the technical and the aesthetical compatibility of the (re-)pointing. During a restoration it may be necessary to reach compromises to comply with both criteria, and, therefore, a thorough documentation and motivation of all restoration aspects is essential.

## Introduction

This paper, based on work done within a EC project [1] on Pointing, aims at contributing to the definition and the preservation of the historical and aesthetical

value of pointing. In order to carry out well-considered conservation and restoration work it is necessary to know the building techniques of the past: the (re-)pointing should meet the criteria of technical and historical/aesthetical compatibility. This work is centred on the historical and aesthetical compatibility.

Research on Historic Pointing in Italy, Spain, Belgium and the Netherlands was carried out, focussing attention on its appearance, aesthetical role, and composition in the course of time. Such an overview was meant to serve as a reference for evaluating cases of re-pointing and to be the background for proposing criteria for re-pointing. Cases of monuments furnished with re-pointing are discussed in this perspective.

Within this project the following definition of pointing is proposed: 'Pointing is the (process of) filling of the outer part of the joints in stone and brick masonry where the bedding mortar has been deliberately left or raked back from the surface or where the original mortar is recessed from the surface [2]'. Pointing is made after bricklaying, within an additional operation, and using a different mortar composition. In the case that the bedding mortar is tooled and/or given a shape directly after application the visual part or it would not be called pointing, but 'tooled bedding mortar'. As a consequence of decay processes most buildings are furnished with new pointing or re-pointing. Pointing/tooled bedding mortar is the 'finishing touch' of a façade. Apart from its main technical protective function, including prevention of the ingress of water, it surely contributes to characterise the appearance of a building. It influences the alternation of light and shade, thus the texture of the masonry, conferring volume and dimension to the wall or façade.

Old buildings, even plain dwellings, can belong to the category of 'monuments', 'memorials' of the past, because of their historic value. 'Know the past to preserve it, preserve it to know it [3]': to know the building traditions of the past is necessary to carry out respectful restorations. 'Well-considered', or 'respectful' does not tout court mean 'philological', it rather means 'homogeneous', 'compatible', in both a technical and an aesthetical sense. New pointing should contribute to the reconstruction of the original aspect of a façade, to bring back its original significance. A good restoration strategy can only be planned on the basis of a thorough reconstruction of the original state of the masonry and the transformations it went through. It is necessary to know our past, our cultural heritage, to be able to preserve it and handle it over to the future generations: the preserved memorials of the past should remain a reliable source of information.

## 1 Historical pointing

The documentation of the past is based on material sources like the monuments themselves or paintings and written documents like old contracts, building specifications and handbooks, which do not necessarily reflect the building practice of their time. Only in the XVIII cent. specific interest in (pointing) mortar is shown in various publications, such as the so called Bommenee's Testament (1750 ca.) [4] in the Netherlands, J. de Villanueva's work in Spain (1827) [5] or F. Milizia's 'Principi' in Italy (1781) [6]. In the XIX cent. one and the same person played the role of the mason and the jointer [7]. The 'jointer' as

a craftsman should have probably made his appearance, in some countries, in relatively recent times. Nowadays not all jointers possess the necessary knowledge and skills to be able to make traditional pointing types.

The fundaments of the pointing technique were laid down by the Romans and exported all over their Empire. After the fall of the Roman Empire, in the difficult times following, the strong tradition they had started was altered or ceased especially among the northern peoples, to be finally resumed in the Mediaeval age, frequently together with other building traditions. The most strongly rooted tradition can be found of course in the Italian Peninsula in the hart of the Empire [8-11].

The quality of the pointing/tooled bedding mortar could considerably vary in time and space, being strongly dependent on the fabrication and building techniques used, the composition of the materials, the skill of the masons and the importance and destination of the building. Moreover, great differences can be also found in time of peace and welfare in comparison with times of war and misery, but also in the same period between buildings located in main cities and buildings located in rural or provincial areas. There is a clear relationship between the development of brick (fabrication/format/quality) and the tooled bedding mortar/pointing: this could be meant to correct the irregularity of the bricks, to reach special effects, or even to emphasise the straightness of the masonry. Pointing in too wide joints was sometimes given the same colour as the brick and fake joints were made in a regular pattern, and finally filled with mortar.

White or painted renderings were used (Roman times, Middle Ages, Neo-classicism). The quality of the masonry underneath (materials and building techniques) could be quite low, which should be taken into account when performing restoration work aiming at leaving in sight what was meant to be hidden. The colour of the tooled bedding mortar and of the pointing played also an aesthetical role. It could be similar to that of the brick/stone, when homogeneity was wanted, or else contrasting with that of the stony materials, and thus forming an evident pattern.

Historic mortars are mainly lime mortars. In the Iberian Peninsula gypsum-lime mortars ('trabadillos') were widely used and in Italy gypsum was used in regions where it was available, on its own or in combination with lime. Generally speaking, pointing mortar was less porous and 'finer' than the bedding mortar. Hydraulic mortars and hydrated lime were used in all countries, as well as sand and additives. In the Netherlands lime was obtained not only from stone but also from shells. From the XIX cent. onwards cement was used in all countries. In the XX cent. cement did generally replace lime for pointing and re-pointing (even in restorations of historic buildings).

Most types of pointing originate in Roman times: flush pointing (tooled bedding mortar), weather struck pointing (I – XV cent.), cut to shape pointing (I – V cent.), concave tooled joint (tooled bedding mortar, III – IV and VI-VII cent.). Also recessed, penny struck, convex and decorative pointing were used, even though less extensively. Only a few types were created in a later stage and are typical of certain cultures. Among these are, for instance, the 'cut to shape pointing' in The Netherlands and Belgium or some types of decorative pointing in Spain. The most recurrent tooled bedding mortar/pointing traditional shapes are presented in fig. 1. Variations are known for most types.

*Tooling of the bedding mortar directly after laying :* after laying the course of bricks/stones the exceeding laying lime mortar is spread over the surface of the brick/stones (or else pushed into the joint). The surface became smooth and uniform, and ready for a plaster layer or for painting.

*Flush pointing:* other than spreading the exceeding bedding mortar, this could be partly pushed into the joint and partly removed by means of a trowel. The obtained finishing was then smooth and full.

*Penny struck pointing or jointed joint*: when the tooled bedding mortar/pointing was irregular and/or wide, a groove was made running in the middle of it, along its length (at 1-2 mm depth), to have the masonry look more regular.

*V-shape pointing:* the mortar could also be tooled in a V shape: the aim of such a finishing was probably merely aesthetical.

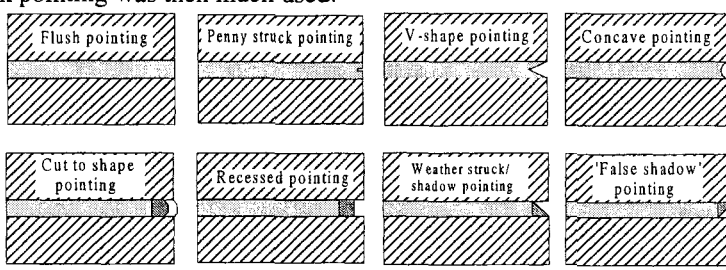
*Concave pointing*: the soft mortar could be pressed and worked into shape by means of a tool having a convex edge resulting in a concave pointing.

*Recessed pointing* : pointing could be 5-10 mm recessed from the brick surface. A recessed pointing is less exposed to rain than a flush pointing. Because of the shadow effects, recessed pointing makes a façade look 'livelier'.

*Cut to shape pointing :* butt and edge pointing can be cut to shape in order to obtain a straight form and occasionally to give the pointing some special effect. This type of pointing is common in the Netherlands and Belgium. In the case that it exceeds a little the surface of the masonry the pointing has a special name in Dutch, *'knipvoeg'*, whereas in the cases of the pointing lying on the same level as the masonry this is called *'snijvoeg'*. Using the mason's pointer a slanting side (facet) was given to the pointing in the direction of the stone. First the edge joint was made, then the butt joint, in order to guarantee the straightness of the latter. Nowadays the work is performed the other way round, to speed it up.

*Weather struck joint/shadow pointing*: the lower side of the butt joint could be made lie on the same level as the brick, whereas the upper side would lie a centimetre recessed, in relation to the brick above. Weather struck pointing showing the opposite sloping direction is known. Weather struck pointing is typical for brickwork. The bricks need to be regular in shape and dimensions.

The Roman building techniques in Italy went through changes in Byzantine times, followed by a period of decadence, in which the masonry lost regularity and the joints became consequently wide, due to lack of good material and skilled masons. The pointing re-appeared in the XIII cent. [12]. The weather struck pointing was then much used.




Drawing 1 Most recurring types of pointing

During the Middle Ages new life was brought to the construction world also outside the Italian Peninsula. In Spain two not autochthon ancient cultures, those of the Romans and the Arabs, who settled in the Iberian Peninsula, had the greatest impact on the evolution of the construction. The Arabs who had invaded the Peninsula in 711, were later submitted by the Christians and called Mudejar. They developed an artistic tradition called after them [13-15]. In the Mudejar architecture the brick plays an outstanding role, being both the principal construction material and decoration element. Among the typical features of this architecture is the use of Toledo style bond. This is characterised by large brick ≅ 4 cm thick, joints in which the size of the tilt ≅ brick thickness (≅ 4 cm), and mortar compositions varying in relation with the resources of each region (bedding mortar: clay/lime mortar; gypsum/lime mortar; pointing mortar: lime mortar; gypsum/lime mortar). The structure and the spaces are Christian, whereas the ornamentation derives from the Muslims Alarifes and the composition of the mortars is due to a syncretism.

The Netherlands [16-20], like Belgium [21], were rich in timber, which was originally much used as a building material for lack of natural stone. Natural stone was used where it was locally available or easy to be imported. Brick became in time the most used building material. The production of brick in the Netherlands, introduced by the Romans, ceased when they left the country (ca. 400). The quality of the building techniques became worse and worse and mortar was produced using available, local materials, due to the deterioration of the organisation of the trade, which explains the lack of homogeneity in its composition. In the middle of the XII cent. the brick fabrication started again and brick soon became the most used building material: in the course of time its size decreased and the joints became less wide. Originally the buildings were furnished with tooled bedding mortar, pushed into the joints or spread on the surface of the units. Only at the end of the XVII cent., and especially in the XVIII cent. *real* pointing was made in the Netherlands, when the 'cut to shape' pointing appeared ('Knipvoegen en snijvoegen').

In the XVIII cent. the bricks could be similar in shape, but not size-holding and, therefore the edges of the bricks were slightly modified using mortar in the same colour of the brick. If one edge joint did not fall exactly above the other, a scratch was sometimes made in the brick where it should have been to fit in the pattern, and a fake joint was made. Finally the original edge joint was disguised using coloured mortar. In XVI-XVII cent. pointing was used in Italy to increase the smoothness of the surface or to reach some wanted effect (e.g. verticality). In the XVII cent. a monolithic appearance was sought. [22]. During the XX cent. the role of pointing in combination with brick receives much attention (1781 appeared Milizia's 'Principj di architettura civile'[6]). In the Netherlands, around the year 1900, the bricks became harder and more regular in form and size. They were assembled using hardly any mortar. Very thin joints were also usual in Spain, in combination with hollow bricks.

## 2 The preservation of the value

Each monumental building is made within an architectonic tradition, and reflects the current building techniques of its time. Its style, the choice of the materials

and their colours, the quality of the work, as well as its location and the environment where it lies, determine the characteristic aspect of a building. The aspect of a building, carrying the significance of the architectonic work, is in fact unique, and, thus should be understood and preserved. In cases when a building was deeply altered in the course of time, the new aspect gained can be referred to as being the most characteristic, reflecting the construction style of the time when the changes occurred.

Conservation and restoration campaigns should aim at the preservation of the individual aspect of a building, which does not always include the conservation of old building materials. The original surface materials often become very much altered, in the course of time, due to deterioration processes, or as a result of radical restorations. The (built) environment may also change, as it often occurs in cities and everywhere there is an interaction between social life and architectonic space. To preserve the aspect of a building does not always mean to preserve its old materials, even though everyone will agree on the statement that 'conservation should have precedence upon renewal [20]'. Conservation should be the first priority and all original parts of a building should be preserved, in order to preserve the knowledge and the value they possess. Nevertheless, because of its nature, any building should perform its function and should live and, therefore, all the necessary substitutions and restorations needed for its life should be done. (In this paper the matter of the consequences of surface treatments for the masonry, which can affect the aspect of the materials will not be tackled).

'The historical value of each part of a building lies in the first place in its being original', is a common assumption. 'Original' as much as 'authentic' [23] can often not be applied to pointing or tooled bedding mortar, because, as noticed before, these are the parts of a building that are normally first substituted (which is often necessary to avoid risks of severe damage to the masonry as a whole).

Now-a-day most buildings are furnished with re-pointing, although in some cases (mainly referring to the XVIII-XIX centuries) the pointing may still be original. Once original tooled bedding mortar or pointing have been substituted their function as 'witnesses' of the original material and technique is lost. The new ones will be then 'witnesses' of the times when they are made. All restorations, even when carried out 'in style' are the result of a certain restoration philosophy and a certain level of technical knowledge. 'In style' restorations of tooled bedding mortars or pointing can be supported in order to maintain the historical aspect of a building. Nevertheless, because a restoration should comply with other requirements, compromises are often necessary.

The shape of pointing (tooling) should remain the same as it originally was. In the case of a building stylistically altered in the past, the new aspect gained could be referred to in the restoration.

The Chart of Venice states that all interventions should be reversible. Probably, within the framework of the restoration of tooled bedding mortar/pointing the discussion should concern compatibility, re-treatability and durability rather then reversibility. Compatibility can be seen as technical compatibility and aesthetical compatibility. Re-treatability includes the application of somehow 'sacrificial' (re-)pointing, which can be easily removed (e.g. when damaged), without involving

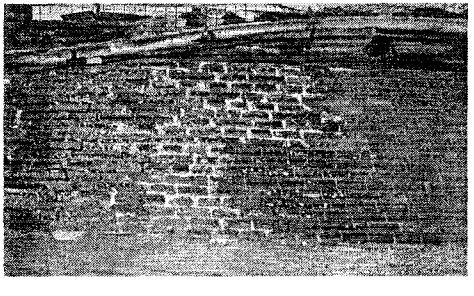
the other masonry components. Durability is not a main characteristic of pointing, historically rather considered as being 'sacrificial', thus of a shorter life-in-service than the other masonry components. If this is the main assumption, still an increase in durability should be aimed at, as an answer to problems caused by environmental pollution and other decay processes. Furthermore it can be the result of better and more suitable mortar compositions. The new pointing material and its tooling should be similar to the old ones, in the case of a philological approach. Philological work plays an important role in the preservation of the authenticity of a building, but it often leads to re-constructions that do not take into account the compatibility and durability of the materials nor the aspect of a building.

Concluding it could be said that the object of the preservation/restoration (that is to say what should be preserved and what should be substituted) should result from a thorough analysis of the monument. This should focus on the original mortar and the (re-)pointing in the course of the history of the building.

## 3. Discussion of cases in the field

There are cases in which the pointing mortar needs substitution, although it is not necessary to substitute all of it. A thorough technical investigation will indicate which parts could be kept. It should be avoided that a so-called 'patchwork effect' is created, which is unfortunately very often the case. Sometimes repair work is carried out with limited funds, and only in the very bad zones. Such repair work is further not always commissioned to jointers who are specialised in restoration, even in the case of representative buildings. The façade should not be divided into little zones and the limit between old and new should not be so evident as it is in the Belgian Convent of Heverlee (fig. 1).

When a whole façade (building) is (re-)pointed, a little area in which the old, tooled mortar/pointing is documented could be preserved, preferably on a protected location, where the materials will not suffer from the attack of environmental agents. From the point of view of the aesthetical compatibility the colour is very important. Even relatively little discrepancies in the colour of the pointing (constituting the 20 % of the surface of a modern façade) can lead to strong differences in the general chromatic impression of a façade. This clearly appears considering the effect of the white (re-)pointing on a tower in Monza, Italy (fig.2).



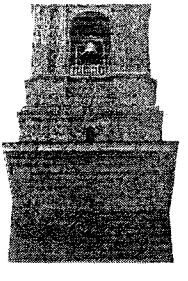
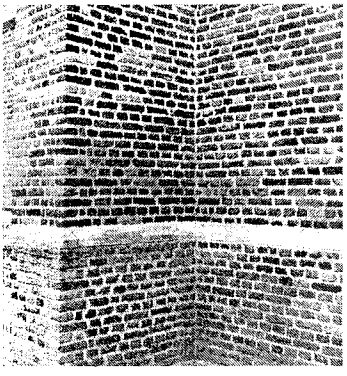


Fig. 1: Heverlee (Be), Convent, detail of wall in which the re-pointing is not homogeneous (patchwork)

Fig.2: Monza (Italy), tower, contrasting, too white re-pointed area (top)



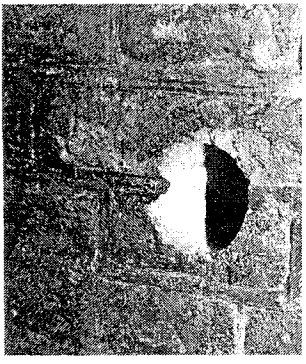
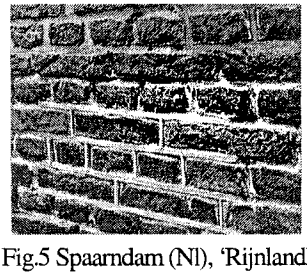


Fig.3. Ede (Nl), Reformed Church, striking white pointing
Fig.4 Vlaardingen (Nl), Reformed Church, tower: detail black pointing in the plinth

The façades of the Reformed Church in Ede in the Netherlands (fig. 3) were furnished with rather wide joints and white re-pointing. The contrast with the brick is very evident. Most bricks have become darker in the course of time because of a natural process, the orange coloured (low fired bricks) have lost material because of a natural weathering process and show the colour of their interior, and, finally, some bricks have become black (patina). The original chromatic aspect of the masonry is gone and the wide joint and white re-pointing underlines the differences in colour and creates a disturbing picture. A little recessed and consequently less wide pointing would have been perhaps less evident, and the white colour could have been a little less bright. A white colour is not always the best choice to create a harmonic picture. In the history of architecture indications can be found that, from the Middle Ages onwards, colour was often used for achieving homogeneity in the masonry [24].The re-pointing can be sometimes given a black colour, to have it match with the masonry, when this has become black. This is the case of the repair pointing applied to the lower part of the tower of Vlaardingen in The Netherlands, where the original flush pointing was white (fig. 4). The change in colour should be taken into account in case the façade (that is to say the brick) is cleaned.

In the world of the Dutch Monument Preservation there are complaints about the usage of furnishing 17$^{th}$ cent. masonry with a cut to shape (re-)pointing, even though that type of tooling was developed and used only in the 18$^{th}$ cent.. A good example is constituted by on of the re-pointing in the test surface made in a monument dating 1641, the 'Rijnlandhuis' in Spaarndam (fig. 5). This is an example of a restoration not taking historic references into account.



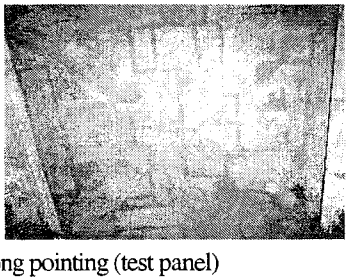
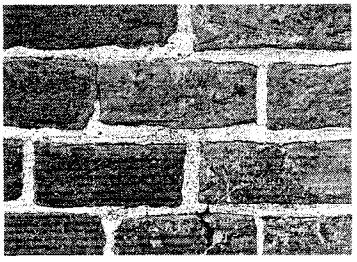


Fig.5 Spaarndam (Nl), 'Rijnlandhuis', historically wrong pointing (test panel)
Fig. 6. Sevilla (S), City Hall, inaccurate re-pointing of a vault.



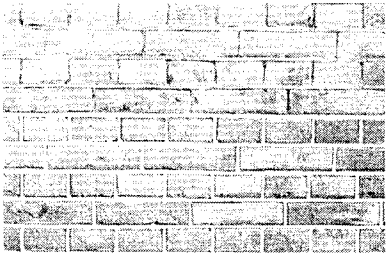


Fig. 7 Wateringen (Nl), 'Hofboerderij', the re-pointing misses the penny stroke
Fig. 8 Royal Stables - The Hague, original thin joints (upper part) broadened during restoration

The width of the pointing is also a fundamental aspect of a restoration. Wide re-pointing, exceeding the space of the joint, is often due to shabbiness and inaccuracy, as in the case of the re-pointing of a vault in the Spanish City Hall of Sevilla (fig. 6). In the case of decayed units a broad re-pointing covering the missing parts of the brick/stone would lead to technical and aesthetical problems. The so-called 'Hofboerderij', a monumental farmhouse in Wateringen, the Netherlands (fig. 7), went through several building phases, until the last restoration campaign in 1983. Near the windows of the brick façade an area with newer masonry can be seen, connected to the old one. The old pointing is furnished with a penny stroke, which is unfortunately not carried out in the newer part of the masonry. The clearance and filling in the joints should be respectfully done. The complex of the Royal Stables in The Hague (fig. 8) was built, laying the bricks close to one another, practically without vertical joints. In the previous last restoration the masonry was re-pointed and the joints were widened to make the filling process easier. A document of the past is thus lost forever.

## 4 Conclusions

The conservation of a façade furnished with pointing/tooled bedding mortar should be not only technically, but also historically and aesthetically well considered.

Some points to be considered in view of a re-pointing follow. Patchwork effects and a too neat chromatic difference between re-pointed zone and the maintained pointing should be avoided. The re-pointing should not necessarily be white (even though this could have been the original colour) if this would contrast with the rest of the masonry: in order to avoid a dissonant and disharmonic effect it may be given a colour. It is of primary importance to make a re-pointing in the historically correct style. This could be the original style or the most representative style, in the case that the building was transformed and in a later architectonic period. The works should be correctly carried out. The re-pointing should be carefully made (by skilled jointers). Clearing and filling operations should not (technically nor aesthetically) damage the existing materials. The masonry units and their relationship should not be altered, e.g. making the joints larger. The re-pointing should be carried out in a way that is respectful of the existing mortars and their form (unless these are technically or historically incompatible with the masonry). It is of great importance to plan a restoration considering the history of the building. All phases of the re-pointing need to be documented.

## Aknowledgements

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