

CONSERVATION OF BRICKWORK AND THE HISTORIC FABRIC ;
BLAST CLEANING OF BRICKWORK

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ABSTRACT

Victoria and its metropolis has a great architectural heritage in brickwork. In the latter half of the nineteenth century, important public buildings, prominent mansions and vernacular suburban villas alike were built of polychromatic brickwork in styles which evoked the traditions of High Victorian eclecticism in the United Kingdom.

Changing fashions in the mid-twentieth century saw much of this exotic polychromy obscured by paint or render. Restoration and exposure of this rich brick heritage is now in vogue, and in recent times the practice of abrasive blasting of facades has developed to clean off paint and otherwise 'restore' the fabric.

The practice is highly destructive and considerably impairs both the aesthetic and structural integrity of the brick fabric.

Specific statutory controls are urgently required to arrest this totally misguided and undesirable practice.

AN INTRODUCTION

This paper is primarily intended to draw attention to the recent phenomenon of sandblast cleaning of brickwork in Victoria.

Although the practice has long been frowned upon by expert building conservation consultants and writers, in the field of suburban vernacular architecture the general public has accepted sandblasting as an entirely practical and economical method for removal of paint and cleaning of brickwork.

Sandblasting of the brick fabric has developed as a vogue finish in residential and commercial building interiors, providing an 'antique' effect.

Whilst this paper does not discuss specific cases where sandblasting has been completed with destructive, even disastrous effect upon the integrity of the brick fabric, representative examples of the abrasive blasters 'art' can be seen at 'Gordon House', 24 Little Bourke Street Melbourne, 95 Johnson Street Fitzroy and 73 Webb Street Fitzroy.

A walk through the inner suburban streets will also be rewarding.

Examples of the more desirable practice of chemical cleaning and washing of brickwork, using methylene chloride and water lances, can be seen to good effect at the recently restored facades of the 'Rialto' and 'Olderfleet' building group in Collins Street Melbourne.

ARCHITECTURAL POLYCHROMY AND THE BRICK HERITAGE

The history of brick manufacturing in Victoria is well treated by Melbourne academic Miles Lewis in his 1972 treatise 'Tradition and Innovation in Victorian Building 1801 - 1865'.

Bricks from Sydney were used at the first settlement at Sorrento in 1802, and again at Westernport Bay in 1826 - 1828.

Lewis records that at the Westernport settlement in 1827, brickmaker Rote made several thousand slop moulded bricks *which were considered superior to those sent from Sydney.* (1)

In October 1834 Edward Henty brought 1.5 tons of bricks from Launceston to Portland, and later in 1835 J.P. Fawcner transported bricks to Melbourne with which to build a chimney. Lewis provides a data laden account of the early development of the brickmaking industry in Victoria in Chapter 4 of his dissertation, observing that

at the time when gold was discovered most bricks were still handmade and fragile, and good ones were the exception rather than the rule. (2)

Few brick buildings from the pre gold-rush era survive in Victoria, and of those accurately documented, most were cement rendered at an early date to prevent further surface deterioration of the soft and unstable brick fabric.

An early example of this practice can be found at the Devonshire Arms in Fitzroy, a two storey brick hotel which has been tentatively dated to 1843. Lewis further observes that *during the early fifties shoddiness was to become universal.* (3)

Relatively rapid technological developments in brick manufacture ensued in the late 1850s, facilitating the evolution of a local stylistic tradition in brick and constructional polychromy.

From tentative beginnings in the early 1860s, polychromatic decoration was incorporated into the brick fabric of important public and ecclesiastical buildings, commercial premises, terrace houses, villas and artisan cottages, until

by 1890, this High Victorian style, which equated with the excesses of the land boom period in 'Marvellous Melbourne', was predominant.

Whole streets in the inner suburbs of Melbourne were characterised by rows of one and two storey terrace houses and villas built of red, cream, white, brown, blue and black bricks from eleven major brickfields at Prahan, Hawthorn, Brunswick, South Yarra, Northcote and Flemington. Each building was individually enhanced with elaborate cast iron verandahs, glass, palisade fences and cement rendered mouldings and elaborate ornamentation.

Early problems with the manufacture of pressed bricks were overcome with the introduction of the Hoffman brick manufacturing process in 1870, and generally the bricks used during Melbourne's frantic building boom of the 1880's were of regular dimension, well burnt, and of sound surface and uniform colour.

Local architects emulated the style of leading English and French exponents of polychromy, with Joseph Reed's Independent Church in Collins Street of 1867 being an outstanding early example of brick polychromy in Victoria.

The Scottish expatriate architects Davidson and Henderson of Geelong introduced ornamental or 'fancy brickwork' to the Western District with their Ashby Wesleyan Parsonage (1869), 'Belleville' at 350 Ryrie Street Geelong (1870) and the Geelong College of 1870, using cream moulded bricks from T.H. Widdicomb's brickworks at Portarlington for dichromatic decoration. These same buildings also demonstrate an innovative and early application of cavity wall construction and bonding bricks in Australia. (4)

The exotic brickwork patterns and bonding designs which characterise both the high fashion and vernacular architecture of the High Victorian period in Melbourne were accented by means of tuck pointing in white lime putty over a mortar joint which was precisely coloured to match the surrounding brickwork.

The art of tuck pointing has recently been revived and skilled artisans are readily available for restoration work in Victoria.

Also, in the field of commercial architecture, polychromatic brickwork was often combined with external ornamentation in freestone, artificial stone, stucco and decorated tiles to heighten the effect.

In Melbourne, William Pitt's designs for the Rialto and Oldfleet buildings in Collins Street (both erected in 1890) and the earlier constructed (1888) South Australian Insurance Building by Oakden Addison and Kemp epitomise the spirit of both the commercial gothic revival and the polychromatic tradition in High Victorian architecture.

Melbourne's inner suburbs were well developed by the beginning of the depression in 1892, and the majority of the building stock in Carlton, Parkville, Brunswick, Fitzroy, Richmond, Collingwood, Prahan, South Melbourne and St. Kilda dates from the latter half of the nineteenth century. These suburbs contain a wealth of Victorian architecture, both high fashion and vernacular.

The fabric of these areas remained essentially intact well into the twentieth century, and it was not until the 1950s that many of these buildings were first renovated.

The High Victorian architectural style was anathema to the post war generation and many of the elaborately ornamented villas in the inner suburbs were emasculated.

Intricate cast iron friezes and balustrades were demolished, cement rendered urns and mouldings were removed from parapets and facades, and the polychromatic brickwork, which characterised much of the late nineteenth century tradition in Melbourne, was painted over for the first time.

The influx of immigrants to the inner suburbs in the 1960s also brought about further changes to the fabric, with many a previously intact Victorian style house being completely transformed in a readily identifiable Mediterranean style.

The property boom of the early 1970s brought about another change of occupancy of the inner suburbs, and a new generation moved in to launch their own renovation and rejuvenation programs.

This young middle class generation set about the recreation of the original Victorian character of the inner suburbs and the restoration of house facades was usually a high priority. Wet sandblasting of facades to remove paintwork or merely to create a fresh new finish became the vogue, and a tour of the inner suburban neighbourhoods previously mentioned, and particularly North Carlton, Carlton, Fitzroy and North Fitzroy will reveal how widespread the practice of sandblasting brick facades has become in Melbourne.

The process was not just confined to painted brick fabric. Facades which were originally finished in the other fashionable nineteenth century surface treatment, stucco, were stripped of their render and the underlying brick fabric sandblasted.

No other process has done more to impair the aesthetic qualities and threaten the very stability of the fabric of nineteenth century housing in Melbourne than the process of abrasive blasting of brickwork.

An examination of the sandblasting process is now in order, indeed necessary.

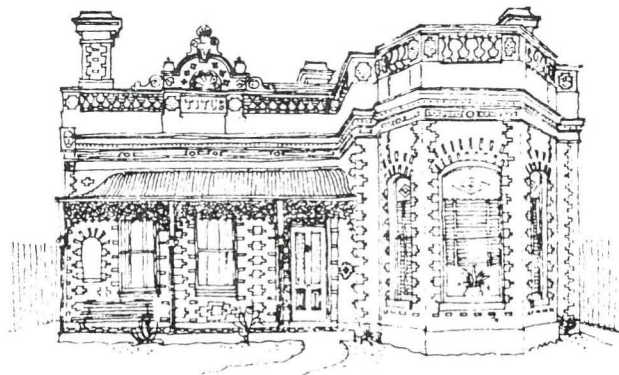
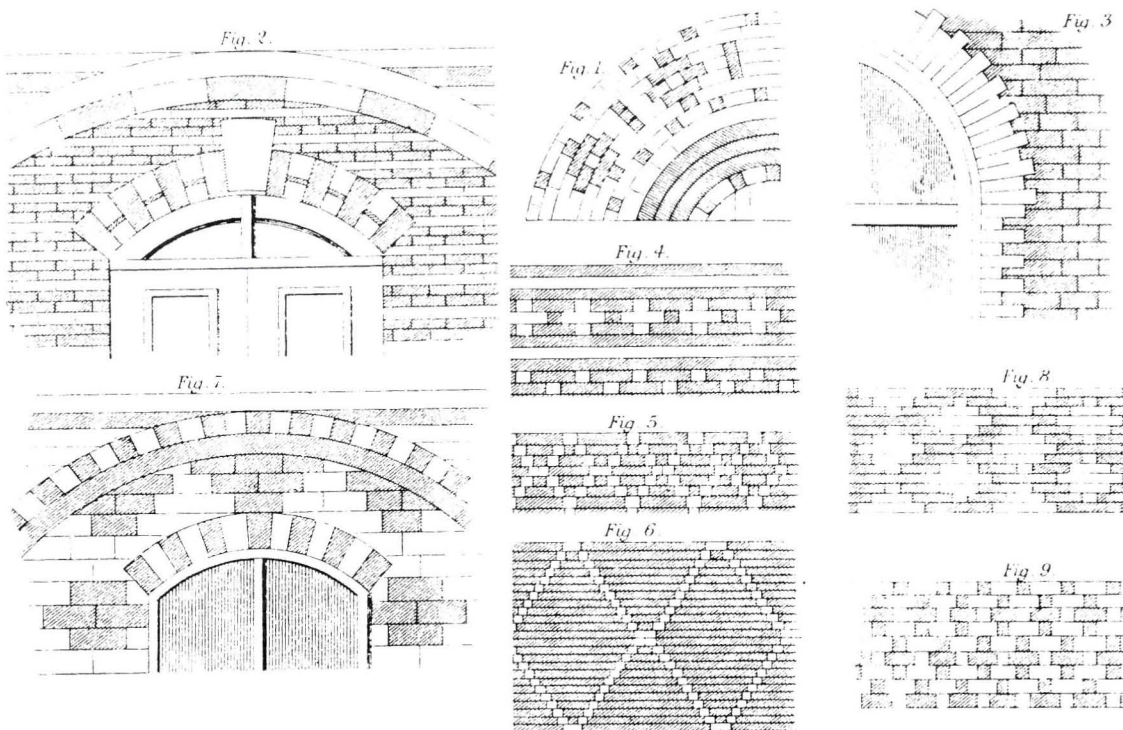


Fig.1 Boom Style Villa from Robin Boyd *Australia's Home* p.54

Fig.2 Polychromatic brickwork patterns suggested by Robert Scott Burn in *The New Guide to Masonry* and as reproduced in Howard Tanner, et. al., *Restoring Old Australian Houses* p.102



CLEANING BRICKWORK BY ABRASIVE (SAND) BLASTING

Although the process has long been utilised in corrosion protection and the steel manufacturing industry, wet sandblasting, as a method of cleaning brickwork, became popular in the late 1960s in Melbourne, and was almost universally adopted by householders as an appropriate technique for cleaning and removing paint from external and internal brickwork of inner suburban residences by 1975.

The sandblasting industry has responded to this demand and the 1984 Yellow Pages Telephone Directory contains three pages of listings under the heading of Abrasive Blasting.

Many of the entries advise of specialist skills or services available for *cleaning and featuring brickwork and bluestone* (5) and one prominent firm claims sandblasting of terrace homes as a speciality.

Whilst a number of listings relate to legitimate applications in industrial and metal protection services in controlled factory conditions, a clear majority of the 68 listings offer on site services with mobile blasting equipment.

Some companies will *travel anywhere in Victoria 24 hours 7 days a week* in search of business and a number of prominent firms have formed the Abrasive Blast Cleaning Association of Victoria.

Mostly this association has concerned itself with the improvement of standards in the sandblasting industry and with the development of specialist services, such as corrosion protection.

The need to establish self imposed standards in the industry became necessary in 1980 following threats from the Environment Protection Authority, the Health Department and the Department of Labour and Industry to severely regulate abrasive blasting to protect the amenity of the environment, guarantee the health of the operators and ensure that standards of safety were maintained in the workplace.

Sandblasting of brickwork is a relatively economical and simple process as far as the amateur and professional building renovator is concerned.

The equipment for wet and dry blasting consists of an air compressor, a blast pot which contains the abrasive agent, venturi feed nozzles, supply hoses and blast nozzles.

Normally, clean washed beach sand is used as the abrasive agent, and the material is entirely lost in the process.

With dry blasting operations, the operator is required to be in sealed protective clothing with an independent air supply, but with wet blasting only protective clothing is used by most operators.

A delivery pressure of 620 kPa (90 p.s.i.) at the nozzle is normally established with the volume of sand and delivery rate being the most important considerations when attempting to remove paint or other material from the surface of the brickwork.

The granulometry of the sand is not an important consideration in general blasting work, although the size and grading of the sand particles has to be established with some specialized applications such as metal and timber blast cleaning.

The distance of the nozzle from the face of the brickwork will also determine the rate at which the paint film over the brickwork is removed. For normal brick cleaning work, the nozzle is held between 300 - 450 mm from the surface.

Sandblasting of the historic and vernacular brick fabric invariably results in irreversible damage to the material, seriously impairing the aesthetic and architectural qualities the process was meant to expose, as well as threatening the longterm structural and physical integrity of the building.

The application of sandblasting to clean brick fabric is totally inappropriate, and whilst this is readily accepted by preservation authorities, conservation architects, historic preservation consultants and writers on conservation theory and practice in Australia, the general public seem to be oblivious to the threat that sandblast cleaning presents to the fabric, be it brick, masonry or timber.

The action of the sand particles is firstly to aggressively remove the paint film or other surface dirt, then erode the mortar joint and tuck pointing, and finally to break down the removal of the paint film has meant that the brick and the mortar joint is invariably damaged in the process, with soft bricks often being eroded instantly.

In a number of cases examined in Melbourne, mortar joints have been eroded to a depth of 20mm and up to 5mm of the surface of the brick irregularly broken away by the action of uncontrolled, aggressive blasting.

The destruction of the well burnt face of the brick, and the erosion of the mortar joint (invariably composed of lime mortar in nineteenth century buildings) allows water to penetrate through the brickwork, causing major efflorescence and spalling problems as well as permanent dampness.

The cutting away of the mortar joint threatens the stability of the wall, with the effective width of bearing in a 230 mm wall being reduced by as much as 40 mm when both faces of a wall are sandblasted.

The loss of the tuck pointed joint is an aesthetic and practical problem, for these lime putty joints and flush mortar backing contribute to the impermeability characteristics of external solid brickwork.

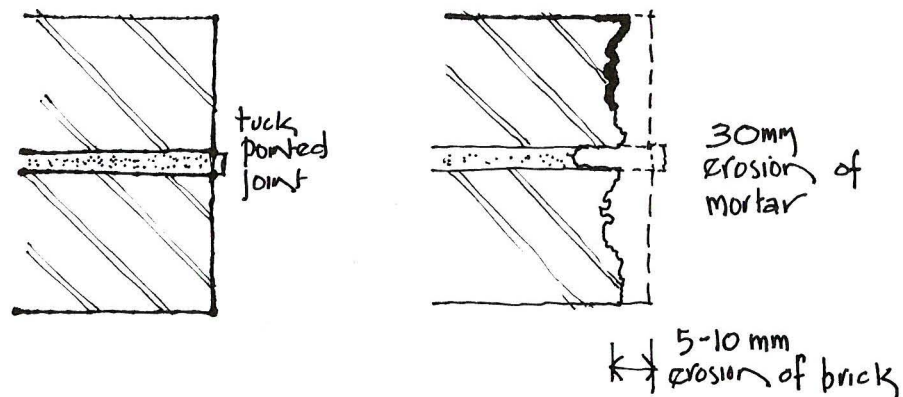


Fig.3 Diagrammatic section through tuck pointed brickwork showing measured impact of abrasive blasting on the fabric.

EXISTING STATUTORY CONTROLS OVER ABRASIVE BLASTING OF BRICKWORK

Sandblast cleaning of brickwork is not covered by the current Victorian Building Regulations 1981 and local government authorities are powerless in this regard.

Some local government authorities request building owners to apply for a building approval to sandblast or chemically clean brick facades, but there is no element of compulsion or statutory force available at the present time.

The Environment Protection Authority requires sandblasting contractors to apply for a permit when working in the open and some local government authorities require a deposit to be lodged to ensure protection of the drains and footpaths etc from damage by sand filtration.

The Historic Buildings Council, operating under the provisions of the Historic Buildings Act 1981, generally will not permit sandblasting of the fabric of the 600 buildings listed on the Historic Buildings Register, insisting instead that chemical

cleaning of brickwork be undertaken when cleaning is in fact necessary.

Under the provisions of the Area Conservation legislation recently implemented in parts of the inner suburban Melbourne (e.g. Fitzroy and Parkville) the responsible planning authority can refuse a permit to alter the exterior facades of a building by sandblasting, but this legislation is yet to take effect, and a great deal of damage to the inner suburban fabric has already been done.

ALTERNATIVE METHODS AVAILABLE FOR CLEANING BRICKWORK

Alternative methods of cleaning brickwork and removing paint from originally unpainted fabric are readily available, but relatively more expensive than the sandblasting process.

Amoroso and Fassina in Stone Decay and Conservation pp.254-298 provide the most informative and comprehensive discussion of the techniques available for cleaning of brickwork and masonry to date, and Ashurst and Dimes in Stone in Building pp.44-50 give an early but reliable summary of the techniques for cleaning as developed in England.

The washing of brickwork and removal of paint by chemical agents is a complex topic and one which warrants separate discussion and examination.

In Victoria, the chemical cleaning of buildings has been recently undertaken at restoration projects such as the Rialto, Olderfleet and S. A. Insurance Building group in Collins Street, using methylene chloride applied in two separate applications and washed away with high pressure water lances.

The application needs to be undertaken in cool weather, the fabric carefully sealed before washing down, and the time in which the chemicals are left to act carefully monitored, with a period of 10 - 15 minutes being the maximum time needed for the methylene chloride to clean the exterior of the Rialto fabric.

CONCLUSION

Abrasive blast cleaning of brickwork of any quality or type is a totally undesirable and destructive practice with the potential to seriously curtail the life expectancy of the building fabric. The process causes severe disfigurement of the face brickwork and associated mortar jointing and usually results in an aesthetically unacceptable finish.

The integrity of the brick is threatened because inevitably the hard burnt protective face is eroded by sandblasting, allowing exposure to atmospheric pollutants, damp penetration and the further destruction by salt crystallization action.

NOTES

1. Miles Lewis, 'Tradition and Innovation in Victorian Building 1801-1865', 1972, p. 169.
2. *ibid.* p.175.
3. *loc. cit.*
4. For a detailed account of the use of the hollow (cavity) wall and Widdicomb's patent bond brick see my thesis 'Two Scots in Victoria: The Architecture of Davidson and Henderson' University of Melbourne, 1983, pp. 302-306.
5. Telecom Australia, *Melbourne Yellow Pages 1984* p.78

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