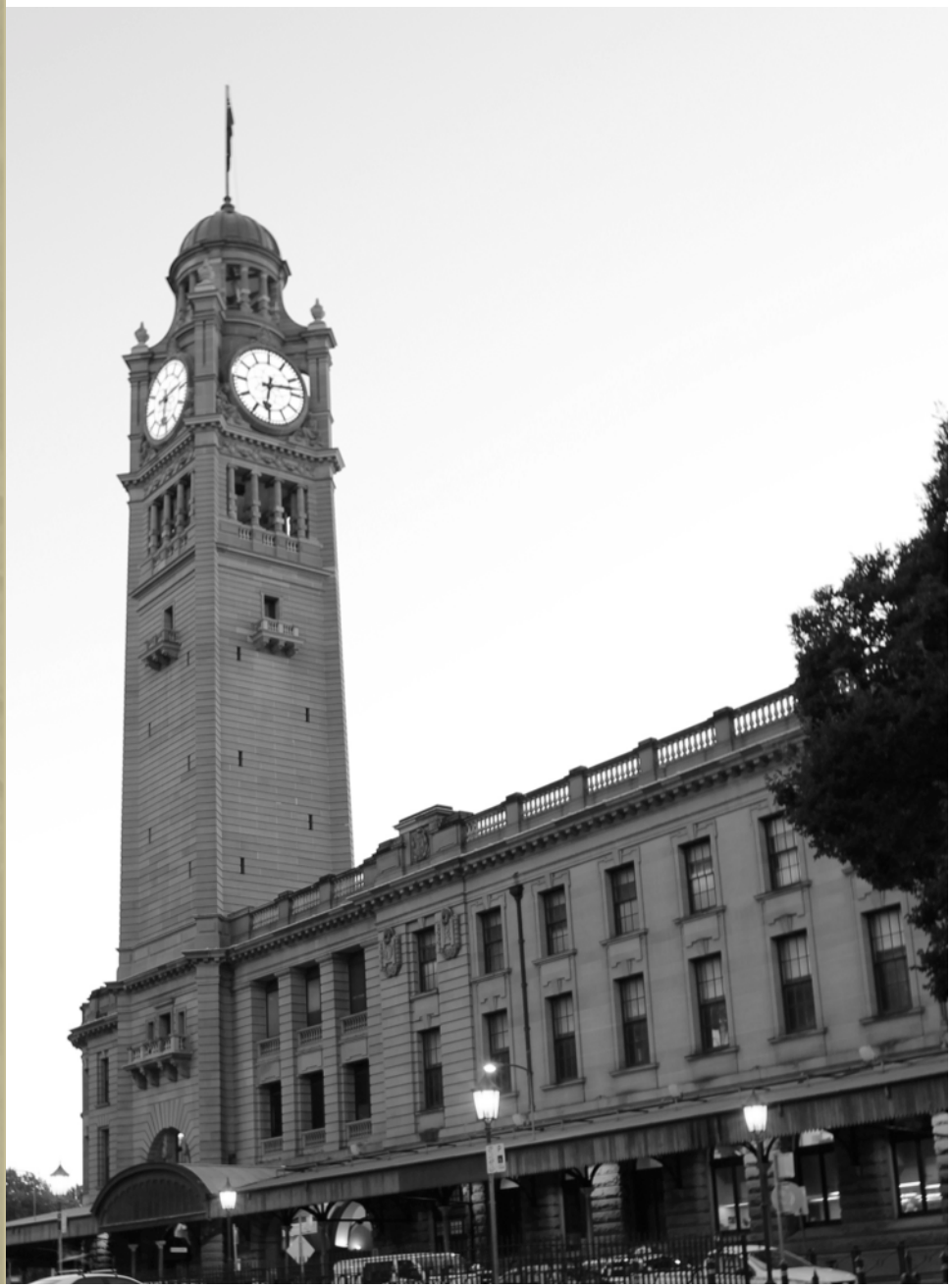
Office of Rail Heritage

NSW Railway Conservation Guide

Conservation Project:

Central Station Clock Tower



Contents of this Guide

Conservation Guide Details

This guide has been prepared by OCP Architects and the Office of Rail Heritage (RailCorp) as part of the NSW Railway Conservation Guide:

http://www.nswrailheritage.com.au/railheritage1.htm

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March 2013

Disclaimer

COVER IMAGE: Completed conservation works to the Clock Tower at Central Station

About this Guide

This guide on the *Central Station Clock Tower Conservation Project* has been prepared for architects, planners and heritage asset maintainers, to assist in the planning and undertaking of conservation works to sandstone buildings. Whilst the focus of the guide is on conservation within a railway context, the guide can be used to assist in planning conservation projects for other types of sandstone buildings.

The guide outlines recommended methods for stone restoration, replacement and maintenance, as well as describes the methodology used for documenting the work, calling of tenders, construction management and engaging skilled professionals.

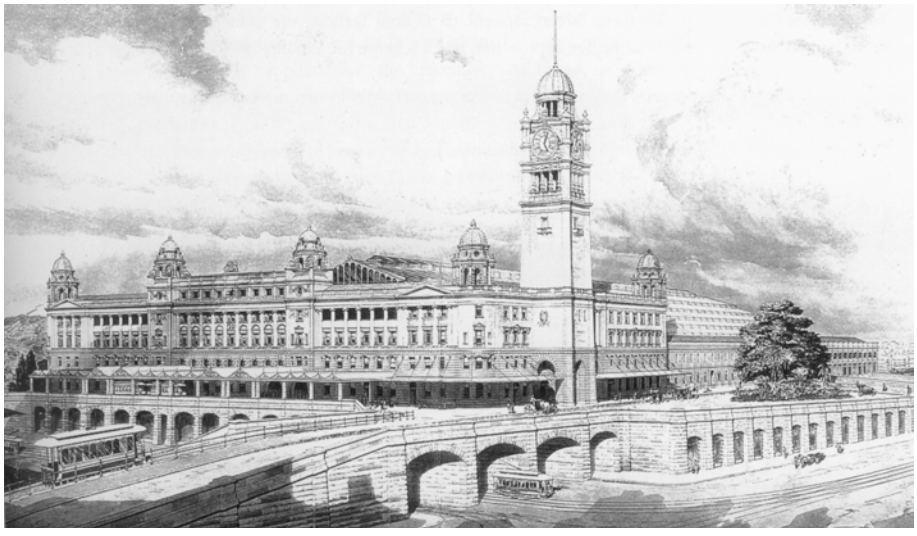
Project Overview

Consulting architects abseiling Central Station Clock Tower (2006).

The centrepiece of the NSW metropolitan railways is undoubtedly the grand station building and sandstone clock tower of Sydney's Central Station. It is one of Sydney's most recognised buildings and is listed on the NSW State Heritage Register. The main building was constructed in two phases in the early 20th Century. The first stage commenced in 1901, whereas the iconic clock tower was completed as part of the second phase of works in 1921 - providing Sydney with the time of day ever since.

Central Station is constructed from Sydney 'Yellow-Block' sandstone, which in severe environments, such as exposed windy and wet locations, weathers and needs maintenance and repair. In some cases, where sections of stone have weathered beyond repair, total replacement is needed. Central Station in the first 50-60 years of its life required almost no maintenance works to the stonework. By the 1980s, however, some evidence of weathering had occurred and minor stone repairs were undertaken. By 2005, the condition of the stonework had further deteriorated, and it was clear that detailed attention to its conservation was required.

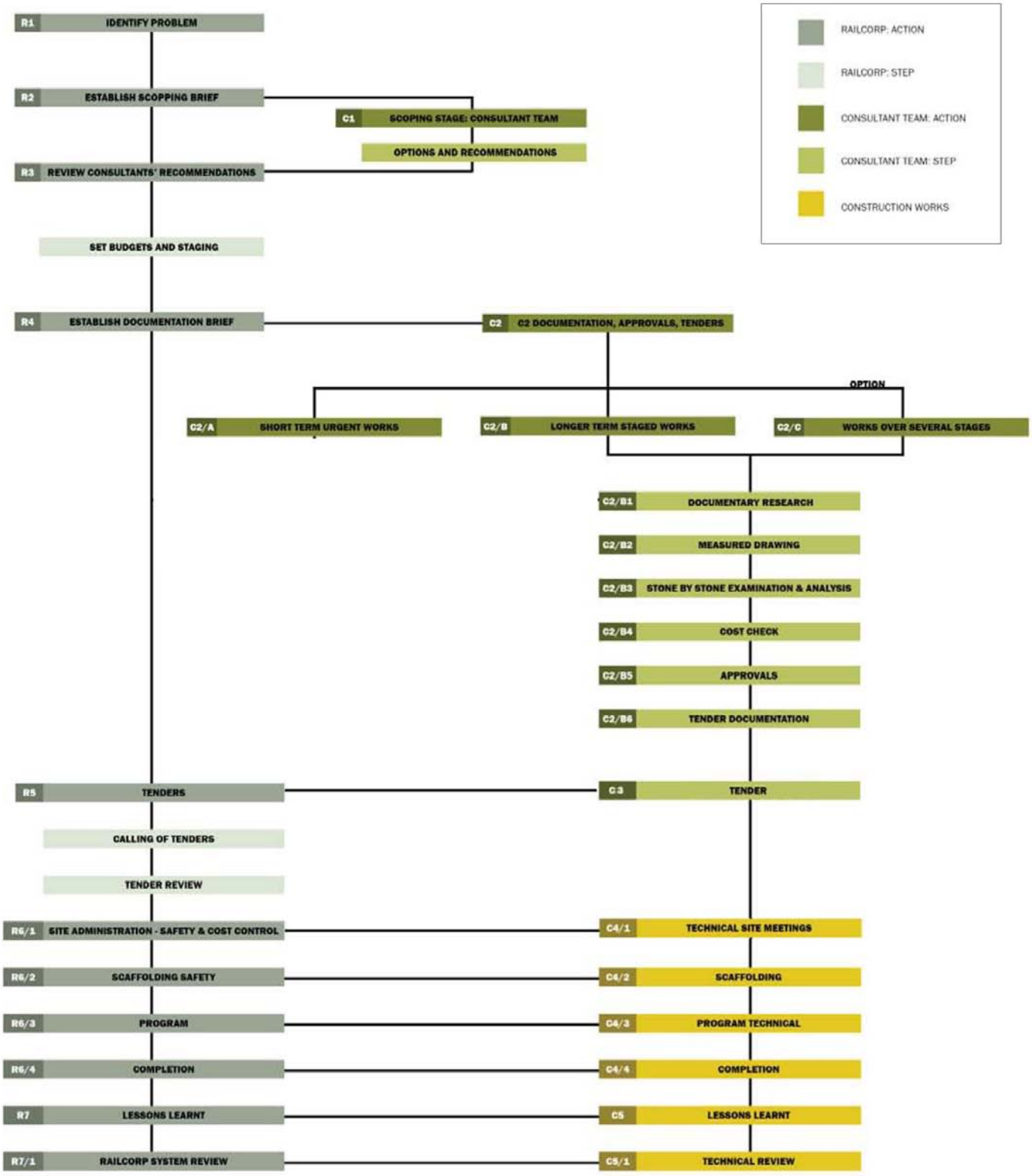
The ensuing stonework program was essentially the first major conservation work conducted to the building since it was completed in 1921. The most complex component in the suite of conservation works was the conservation of the 86m high clock tower.

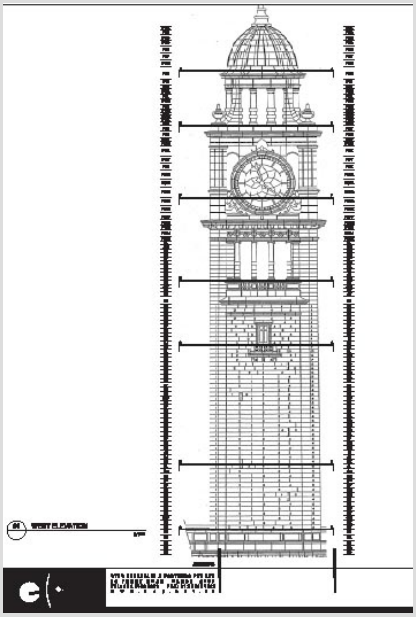


Original sketch drawing of Central Station.

Project Stages

The chart below shows the stages undertaken for completing the Central Station Stone Conservation Project. This guide focuses on the works undertaken during Documentation to Tender Stage (C2) and Construction Stage (C4). Details on the types of conservation works undertaken as part of the project are outlined in the subsequent sections below.





Measured Drawing by OCP Architects (2007)

Stone-by-stone analysis during abseiling of Clock Tower (2006)

Stone defects to cornices of Clock Tower.

Documentary Research (Stage C2/B1)

The works to conserve the clock tower were preceded by six years of detailed research and documentation by conservation architect Otto Cserhalmi & Partners (OCP Architects) on behalf of RailCorp. In order to commence the research, original drawings of the building were located, analysed and scanned.

Measured Drawings (Stage C2/B2)

Measured drawings, based on historic drawings, were then prepared for the whole tower. Every stone of the tower was located and numbered to allow for a thorough investigation and analysis of the building. This was challenging as some areas could not be seen from street level. The documentation amounted to tens of thousands of individually identified stones that make up Central Station. A system for labelling each course of stone was developed, and each stone provided a unique identification number.

Stone By Stone Examination and Analysis (Stage C2/B3)

Initially the architects had to determine how the building was to be accessed to allow for a stone-by-stone inspection. The usual method of using mechanical hoists could not be used due to the adjacent railway electricity lines. Also as the concourse of the station was located above ground level the maximum loadings allowable were limited. The architects therefore had to learn to abseil in order to inspect the exterior of the tower. The safety of the architectural staff, railway employees and the general public had to be determined and areas cordoned-off during the abseiling process. One of the most challenging areas for the architects was the abseiling of the clock face where the hour arms were in continuous movement.

The elements of the tower which showed the most levels of deterioration when inspections were undertaken were the upper dome, top sections of the tower such as the large-scale decorative urns, projecting stonework such as cornices, string courses, balconies and the large statues around the tower clock-face. Each of the 3500 stone blocks on the outer face of the tower were labelled, inspected and documented. This included: stone number, stone location, stone finish, type of conservation action required, physical size of the repair, and photograph of defect.

The meticulous stone-by-stone documentation of the building allowed a specification for various treatments for the stonework. Complex replacement or indented stone entries (see below) included a scaled detail or drawing of the individual stone, and cross-referenced to structural engineer's details. Each stone's 'heritage significance' was considered before a repair type was specified. Highly significant stones such as statues were repaired rather than replaced, even when the repairs costs were more than that of the replaced 'new' element.

Cost Check (Stage C2/B4)

During the documentation stage when sufficient stone schedules were available, a consultant Quantity Surveyor established an appropriate sandstone budget. As stonework is extremely specialised, quantity surveyors require the input of architects with stone experience and skilled master masons to assist compiling the elemental costs. The Quantity Surveyor can also assist in the tender assessment and during the construction period to assist in any change of scope to the project.

Approvals (Stage C2/B5)

The station is highly regarded by the people of NSW, recognised by its listing on the State Heritage Register (SHR). The significance of the place is embedded in its high-quality materials and recognition as a major public sandstone building in Sydney. Items listed on the SHR are protected under the *NSW Heritage Act*, and approval from the NSW Heritage Council is required before works can commence.

Every stone was individually numbered and entered onto a master drawing. Individual stones also had large-scale details drawn showing individual works.

Tender Documentation (Stage C2/B6) and Tender Process (R5, C3)

The Tender package was carefully put together incorporating the following:

i. Specifications prepared with input from skilled stone craftsmen, coppersmiths, lead workers as well as assistance from analytical laboratories, petrologists etc.
ii. Drawings of all elevations showing every stone numbered. Details at large scale of all stone repair types lead and copper covering details.
iii. Schedules of Works that had an entry of every stone that required work to it, cross referenced to the drawings and to a photographic list.
iv. Structural Engineer's stainless steel pinning details, cross referenced to architects schedules and drawings.
v. Tender forms requesting CV's of stone, lead and copper craftsmen.
vi. Detailed schedule of rates for all types of stone repair methods were also requested to assist in variances to the scope brought about by any latent conditions found during the construction period.

Attendance at mandatory site meetings to understand the detailed safety requirements of the project were also required as part of the tender process.

Technical Site Meetings and Site Administration (C4/1 + R6/1)

Throughout the project regular meetings were held with the project team to discuss safety issues and programming. Regular site meetings were also held for coordinating technical aspects, quality checks, analysing test samples and agreeing on works, such as individual stone repair and cleaning methods. All site visits were documented to capture the decision making process.

Scaffolding of Central Station Clock Tower enclosed inside polyethylene to ensure maximum safety protection of the public.

Scaffolding (C4/2 + R6/2)

One of the biggest challenges of the project was that the work site was located above a high volume commuter traffic area, where thousands of rail patrons use the premises at all hours. During the 18-month period of construction works, Central Station continued to be an operational railway station with an average of over 170,000 people passing through Central Station each day.

The scaffolding of the building for the construction work therefore required the engineer to design a system that could support lifting stones up to 4 tons in weight. A second consultant engineer also reviewed the scaffolding design. Due to the need for upmost public safety the scaffolding was covered with polyethylene sheeting, which ensured that even the smallest of debris would not fall from the tower. The sheeting also provided all weather protection for the work program and controlled the work environment to undertake delicate conservation works – in particular during the desalination process.

Program (C4/3 + R6/3)

RailCorp Project Managers ensured that the project program was updated monthly to capture works completed and any change to the scope of works. The contractors' input was required to ensure that targets were met. As latent conditions often arose, it was crucial to monitor the overall program. RailCorp ensured cost controls were checked, assisted by architects and quantity surveyor.

In addition to the stonework undertaken, internal concrete and steel strengthening works were completed, the clock mechanism upgraded, and the existing flagpole strengthened and restored.

The Clock Tower's Juliet balcony before and after restoration. Light coloured stones are those that have been replaced or indented, including the 4 ton floor slab stones.

Completion (C4/4 + R6/4), Lessons Learnt and Technical Review (R7 + C5)

The consultant architect team ensured that all 'Hold-Points' were signed off, and works completed as specified. The carefully documented and executed stone, lead and copper work completed on the clock tower have ensured this significant structure will be conserved for decades to come as well as provide the basis for an ongoing maintenance plan. Measured drawings and the schedules of each stone will allow future professionals to have an accurate database that they can refer to understand the previous condition of each stone and repair works undertaken.

Following completion of the physical construction works it was critical to ensure that a full list of relevant contractors/subcontractors and their details were kept to assist in any ongoing maintenance requirements.

The project's success and achievement was recognised through being the recipient of a 2012 NSW Australian Institute of Architects - Heritage Architecture Award.

Types of Stone Conservation/ Repair Works

The replacement stone for the Clock Tower's Juliet 4 ton floor slab.

The stone conservation works undertaken as part of the Central Station Clock Tower Conservation Project have been aimed at achieving a long-term repair cycle. As scaffolding costs are comparatively expensive, it is important to consider the target of how long a repair program is aiming to achieve - a 'short cycle' of 10 to 20 years, or 'long cycle' of around 50 years. The types of repairs will vary depending on the choice of method. With shorter cycles less work and less enduring techniques can be used, however, on the other hand, the cost of re-scaffolding will be expensive. The longer term cycle will require more work to be undertaken, achieving longer lasting results, but have less scaffolding costs.

The project included a range of modern and traditional techniques to conserve the stonework, as outlined below.

Stone block replacement for wall cappings.

Sandstone Block Replacement

Whole blocks of badly deteriorated stone masonry were replaced with new blocks of compatible natural stone. New stone was carefully selected to match the original Sydney sandstone and was sourced from the NSW Government store of 'Pyrmont Yellow-Block McCaffreys' stone. Some 358 stones were replaced with the largest being the Clock Tower's Juliette balcony protruding floor slabs that weighed around 4 tons each.

Many factors are required to be addressed when choosing new replacement stone. Initially the existing stonework needs to be examined and tested. Petrographic tests should be completed that allow the stone chemical composition to be understood. Salt testing should also be undertaken to work out what pollutants are in the existing stones and to determine if they are of sufficient percentages or if they are causing deterioration of the stonework.

New stone urns stored on site (right) ready to be hauled via pulley up to the Clock Tower, and the new urns reconstructed (above).

New indented stonework.

New stone should be as close as possible to the same chemical composition as the original stone. It is preferable to get stone from the same geographical area as the original stonework, otherwise there could be a chemical imbalance between the new and old stone, which can cause long-term deterioration. Samples of new stone should also be tested for chemical composition as well as strength characteristics. The colour, texture and banding should be examined and samples of stones should be compared to original stones on site.

It should be acknowledged that any new replacement stone will take some time for it to weather and match the colour of the existing stonework. Generally, the artificial aging of new sandstone should not be encouraged as chemicals used for weathering the stone may cause more long-term damage through leaving a legacy of extra salts in the stonework causing further deterioration of surrounding stonework. Hence, new stonework should be allowed to age gracefully with time, rather than aiming for an immediate 'match' in colour to the existing structure.

Sandstone Indenting

Stonework retooled after indenting.

Where stone is badly deteriorated and needs replacing, but the location of the stone is such that there are stones above it and it cannot be lifted out, then the stonework needs to be 'indented'. Indentation is the process of replacing only the outer section of the stonework.

The indented stone section needs to be of sufficient depth to allow for pinning to occur. Stainless steel is usually used for pinning. Indented stones should not be too thin, but generally have a minimum of 110 to 150mm depth. Where the stones project such as cornices or string courses, the depth of indent should be at least equivalent to the depth of projection. This latter indent geometry is crucial when earthquake or seismic concerns are considered, this ensures the indent is not totally relying on the stainless steel pins but the natural balancing of 'projecting' to 'embedded' stonework.

Hairline Indents

Hairline indent for small section of existing stone block.

When only a section of a stone block requires being replaced, then indenting or replacement methods can be replaced by smaller 'hairline' indents. These are similar to normal indents except much smaller and with very fine joints. To ensure these smaller indents are safe, modern practice, especially due to seismic concerns, requires the stones to be pinned. The advantage of hairline indents in lieu of 'synthetic repair' techniques (see below) is that they have decades long lasting qualities similar to the parent stones.

Repointing

Various sands used to obtain pointing mixes that match original mortars.

The purpose of pointing in traditional masonry buildings is often misunderstood. Lime mortar has been used for centuries, as it is deliberately weaker than the surrounding materials, so that stone walls can expand and contract. The modern use of overly cement-rich pointing does not allow for expansion and eventually tears away the stonework it abuts, irreversibly damaging the stonework.

Lime mortar, being weaker, needs to be monitored and any defects repaired on a regular basis (at a minimum every decade). Otherwise, if the pointing falls out, then water can penetrate the fabric and cause considerable damage to the stonework behind and below it.

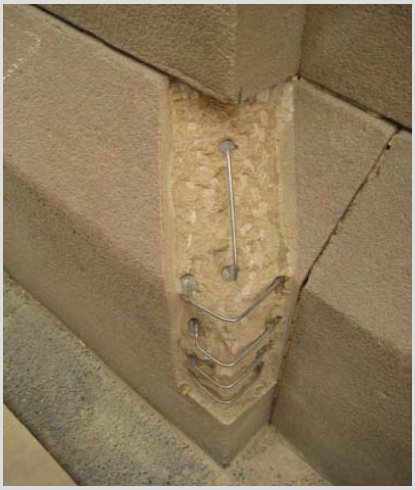
The composition of the original mortar should be examined, and the replacement pointing mix should match the composition of the original. Best practice entails laboratory analysis on a sample of the original pointing. The texture and colour of the repointing mix is important and trial samples are necessary as part of a tender process. The examination needs to occur after the mix has sufficiently dried out so that a true comparison can be made between the colour of the old and new pointing.

Samples of various synthetic stone mixes trialled using different sands.

The depth of pointing is critical. A common fault of past repointing exercises is that the pointing is not deep enough and so the new pointing falls out within a few years. The minimum depth of repointing should be at least 25 to 30 mm deep. Raking out of joints should be carefully undertaken. Best practice is that it is performed by hand tools as mechanical tools can damage the abutting stone surfaces. To ensure that a high standard in repointing is achieved, only skilled masons should be engaged to undertake the work.

Synthetic Sandstone Repair

This technique is used for small sections of stone repair. It uses specialised epoxy resins mixed with selected sands. It is used primarily where other techniques such as hairline indents are not possible or where indenting would destroy too much of a heritage significant stone, such as, small elements of a statue. This technique is used for small areas of stone that had failed due to weathering and is intended to slow weathering or minor damage rather than large structural repairs.



Stainless steel reinforcements typical of synthetic repair patches.

The use is also where safety issues are of a less of a concern. Hence, the repair of say a soffit of a cornice, using synthetic repair patches, would be extremely unsafe and is discouraged. Synthetic patches generally have a short lifespan of only 10 to 20 years. Extensive use of synthetic work will also result in need to re-scaffold a building about every 10 to 20 years. Hence their application is very limited in conservation work.

Synthetic stone repair methods have been tested by local analytical laboratories over the last 30 years and there is now a small group of masons that have the understanding of these tested techniques and the required skills to undertake this work. The best method involves using a variety of natural coloured sands to achieve appropriate matching colours and that are colour fast for a reasonable period of time. Other techniques such as 'mortar patching' are usually only acceptable on sandstone where it is protected such as underneath lead coverings.

Desalination

Paper-mache poultice being applied to ramp up to Clock Tower.

Sandstone buildings being a soft sedimentary stone can suffer from the deposition of atmospheric pollutants. Most pollutants are washed off vertical surfaces naturally by rainwater, however protected areas such as the soffits of exposed stones of cornices are prone to accumulated pollutants as they are protected from the rainwater. The most common pollutant is sulphur from car exhausts, but chlorides from the seacoast and even old coal deposits from the steam era were found at Central Station. Accumulated pollutants eventually start to attack the sandstone.

Sandstone desalinates with time and can be dangerous, particularly in areas where there are exposed projecting stones (e.g. cornices) above pedestrian areas. Therefore, as part of conserving the exposed stone areas, a desalination process is normally included in stone projects. There are a number of techniques, from watering and sponging off, to sand-lime mixes or the use of special paper-mache poultices.

At Central, pollutants were removed using a specialised poultice where there was evidence of areas of salt activity and delamination/scaling of the outer surface to the stone. After a poultice is applied and as the wall dries, water-carrying salts evaporate at the surface depositing salt in the sacrificial paper-mache material. Natural drying processes ensure that salts crystallize near the outer surfaces and the applied poultice layer acts as a sacrificial layer where salts are deposited. When the poultice dries out the salt-ridden poultice can be removed.

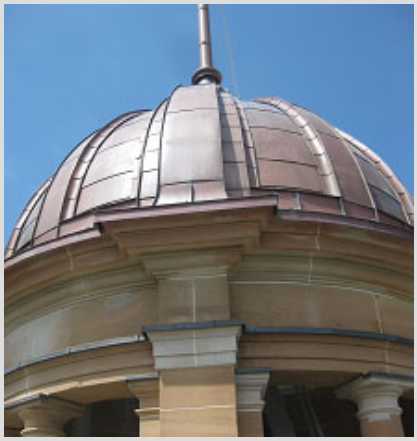
Normally, at least two coats of poultice are required, but sometimes a third coat is necessary. It is important that a number of salt tests are undertaken so that quantity of salts in each stage is known i.e. before starting the desalination process, and after each coat of poultice layer.

Barrier Protection

Protection of projecting stones through lead coverings.

In order to provide long-term protection to exposed stonework such as cornices, string courses and balconies, lead work coverings can be introduced so that water is shed off horizontal surfaces. In the case of Central Station, new materials such as lead and copper were introduced to vulnerable parts of the exterior stonework prone to ongoing weathering and deterioration to assist in the long-term conservation of the structure.

Lead coverings were introduced on top of projecting cornices, balconies, around the top of the clock faces and above statue heads. The use of lead in these areas will assist in diverting water away from the structure and prolong the life of the existing stone. These elements have a minimal impact on the overall integrity and aesthetics of the original structure. An exception to this is the original dome of the tower, which was originally constructed in sandstone with just a copper crown to support the flagpole. The constant exposure to weathering of this stone element over time had caused considerable deterioration as well as water egress to the interior of the structure also impacting on the internal concrete slabs.



Introduced copper dome covering to protect original fragile stonework.

Reconstructing the dome in sandstone was considered as an option, however, due to ongoing weathering and exposure, the dome would have required further and constant repair in future years. As such, the option was put forward to clad the entire dome in copper, reflecting its traditional use in other domed grand public buildings in Sydney. The use of copper provides a suitable balance between practical conservation and retention of heritage fabric, by allowing the conservation of the original sandstone fabric in situ as well as assisting in the ongoing maintenance of the structure.

Cleaning of Stonework

Stone buildings should not be cleaned to create a 'new looking' structure. Cleaning should only be done 'as much as necessary', to allow for restoration or maintenance programs to be undertaken. It is also important to ensure that any cleaning process has the least harmful side effects. Many stone buildings have been irreversibly damaged due to over harsh cleaning techniques, typically when sand or grit blasting have attacked the outer case-hardened stone layer. This in turn leaves a very weak outer layer that then traps air borne pollutants as well as grit and dust from the air and forms a base for excessive fungi growth.

Cleaning of sandstone.

Many techniques are extremely aggressive such as sand or grit blasting. These should not be used on sandstone buildings. It is important that when cleaning processes are used an independent superintendent such as the architect monitors the pressures used and starts with a trial sample first. The best systems are where the pressure systems can be better controlled. At Central the specialised French 'Gommage' technique was used to gently clean stonework. This dry process does not require any detergent or chemical products and uses minimal abrasive elements.

Similarly, the removal of graffiti needs to be undertaken with care, as some products can leave an acidic residue within the stone. This can cause long-term damage to the fabric of the stone, in particular to the face of the stone. A trial should be undertaken first to assess the effectiveness of the removal and to assess whether there is any remaining residue. This assessment should include laboratory testing and analysis.

Conservation Approach

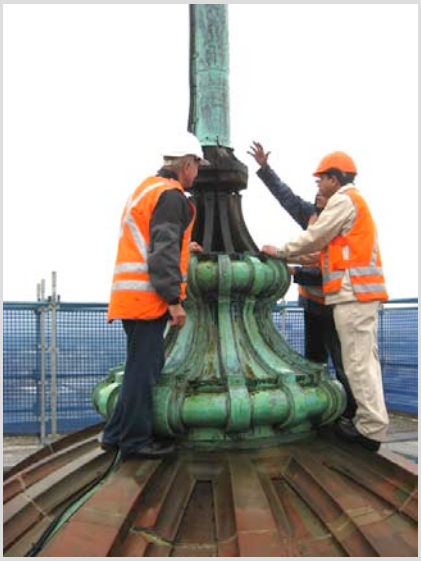
The Central Station Clock Tower Conservation project provides a clear demonstration of applying heritage industry best-practices to the conservation of a place of cultural heritage significance. The completed works were preceded by a period of careful assessment, documentation, analysis and liaison with various stakeholders to ensure that conservation remained at the core of the project.

The range of stone conservation techniques undertaken throughout the project reflects a complete spectrum of current heritage industry practices, technology and innovation available in Australia. The project shows how both traditional techniques and skills, such as new masonry and repointing, can be combined with modern technologies and approaches to conservation, such as modern sandstone cleaning products and barrier protection, to achieve an optimum heritage conservation outcome.

Maintenance and Repair

Generally, damaged stone cannot be restored to its original state, but a number of repair techniques can assist in rectifying existing damage and prevent ongoing deterioration. The completed project adheres to the processes outlined in the Burra Charter with a focus on the maintenance and repair of the original and significant sandstone fabric, to prolong the lifespan of the original fabric rather than more intensive restoration works.

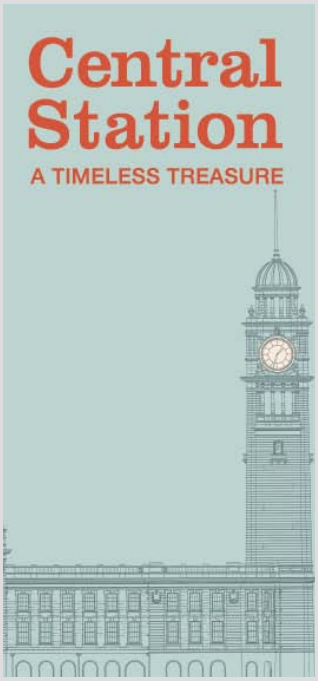
In addition to the stoneworks, an example of this approach was the restoration of the 90 year old flagpole which was carefully taken down in order to remove parts of its rusted metal core. The works included treating the deteriorated steel of the pole, and only replacing sections of the metal that had structurally failed, ensuring the ongoing integrity of this element as well as conservation of original material. The restored 9.7m high flag pole was then craned back on to the top of the dome.



The reconstructed flagpole being inspected (above) and being craned into place (right).

Stonemason's tools.

Masons ensuring accuracy by creating templates of existing stone profiles.



Exhibition poster from 'A Timeless Treasure'

Skills and Techniques

The project drew on qualified and local specialist expertise to advise and specify the best methods for sandstone repair to the structure. The expertise engaged in the project ensured current and tested industry best-practices were applied to the conservation of the item.

The large scale of the project provided opportunity for the development and continuity of traditional skills in NSW such as stonemasonry, copper work and lead work. Over 75,000 man-hours were invested in the project, resulting in the employment of a range of tradespeople over an 18 month period skilled in specialist fields to advance and continue these traditional trades.

The craftsmanship and completed works of the building is considered to be of the highest quality. The project also advanced the specialist knowledge and application of modern sandstone repair techniques, as well as the processes involved with recording and documenting sandstone structures. The knowledge gained through this project will be invaluable to future projects for other railway sandstone structures and large-scale conservation projects.

Materials

Works were undertaken to ensure they match the original design, including using authentic materials such as the Pyrmont 'Yellow Block' sandstone in order to match the colour and texture of the original sandstone as closely as possible. The use of historic materials and construction techniques are important to ensure the integrity and cultural significance of a place is retained.

Interpretation and Education

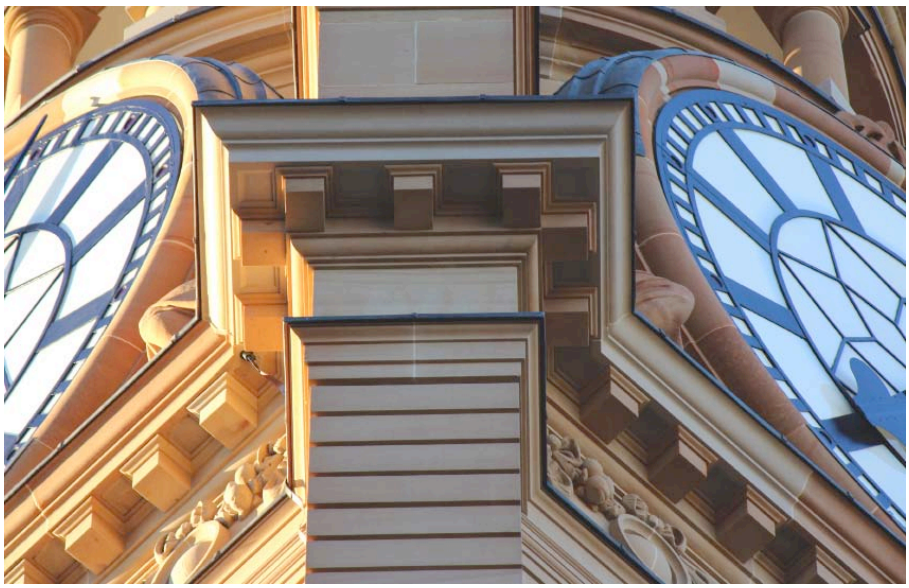
During the period of conservation works, a free public exhibition 'Central Station – A Timeless Treasure' was held at the Rail Heritage Centre located on the main concourse of the station. The exhibition displayed the history of the station and included an overview of the conservation works being undertaken. On display in the exhibition was one of the original sandstone Juliette balconies removed as part of the conservation works and the original clock hands. Over 3000 people attended the exhibition, with over 400 visitor messages recorded, affirming the significance of the place and wider values of the community attached to rail heritage.

During the course of the project, a number of site visits were conducted by other Government heritage groups and practicing heritage professionals. These visits demonstrated the processes and intricate work involved during construction and decision-making processes involved with a large and complex project. These education initiatives will assist in dispersing sandstone conservation knowledge amongst other heritage industry groups. The knowledge gathered throughout the project has been recorded through various devices, such as the completion of this guide which will continue to play an important part in capturing the knowledge and 'lessons learnt' throughout a project.

Sustainability

The project demonstrates a commitment to environmental sustainability through a focus on conservation of existing fabric, optimisation of an existing heritage landmark, retention of embodied energy in existing resources, and a focus on reducing long-term maintenance costs and building waste. The project will assist in the continuity of the original use of the station and its viability at the core of an expanding and diverse transport system in NSW.

Completed works to the Clock Tower at Central Station.



The project team celebrated the erection of the flag on the clock tower on Australian National Flag Day on 3 September 2011. This was the first time in 10 years that the flag was raised on the tower, and commemorates the first day the Australian flag was flown, 110 years ago at the Melbourne Royal Exhibition building.

Project Team

Conservation Architect: Otto Cserhalmi (OCP Architects PTY LTD)

Structural Engineer: Hari Gohil (Shreeji Consulting)

Building Contractor: Heritage Building Services

Senior Project Manager: Eddie Yeow (RailCorp Engineering and Projects)

Project Manager: Wali Ahmed (RailCorp Engineering and Projects)

Project Manager: Narasimhiah Shashikanth (RailCorp Engineering and Projects)

Project Engineer: Asim Rasheed (RailCorp Engineering and Projects)

Safety Facilitator: Shona Guthrie (RailCorp Engineering and Projects)

Environmental Facilitator: Matt Neeson (RailCorp Engineering and Projects)

Program Manager: Richard Mumford (RailCorp Engineering and Projects)

Project Sponsor: John Minchin/ Glen Green (RailCorp Infrastructure Facilities)

Glossary

Burra Charter	*The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance,* 1999.
Conservation	Means all the processes of looking after a place so as to retain its cultural significance (Burra Charter Article 1.1). Conservation can include 'maintenance', 'preservation' and 'restoration' works.
Cultural Significance	Means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups.
Fabric	Fabric means all the physical material of the place including components, fixtures, contents and objects.
Maintenance	Means the continuous protective care of the fabric and setting of a place, and is to be distinguished from 'repair'. Repair involves 'restoration' or 'reconstruction' (Burra Charter Article 1.5).
Preservation	Means maintaining the fabric of a place in its existing state and retarding deterioration (Burra Charter Article 1.6).
Reconstruction	Means returning a place to a known earlier state and distinguished from 'restoration' by the introduction of new material into the fabric (Burra Charter Article 1.8).
Restoration	Means returning the existing fabric of a place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material (Burra Charter Article 1.7).
State Heritage Register (SHR)	A register of places that are considered to be of 'state' significance, and protected under the *NSW Heritage Act 1977.*