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CASE STUDIES

ALTO HOTEL
636 Bourke Street

The Alto Hotel at 636 Bourke Street is an excellent example of the transformation of a heritage space into a low carbon emissions hotel.

Built

1916

NLA

Hotel – 2800 m²

Tenancy

Hotel accommodation

Building owner

Krauskopf Investments Pty Ltd

Property manager

Bourke Street Hotel and Apartments Pty Ltd

Refurbishment project timelines

2002- 2006

Project team

Project manager: Ricardo Krauskopf
Architect; Domain Ramsay Architects
Builder: Villex Constructions

NABERS Energy

Current: 5.0

NABERS Water

Current: 3.0

Key refurbishment features

- Insulating the building to substantially reduce the heat / noise transfer
- High star rating HVAC inverters, with sensor controls
- Heat as required gas water
- Hot water reticulation system
- Low flow taps and showers
- Fluoro or LED lamps
- Replenishable dispensers
- Fluoro lamps and frying oil disposal.

Energy saving

36 mega-joules / guest / day (78/6% better than hotel best practice).

Water saving

123 litres /guest (68% better than hotel best practice).

Greenhouse saving

3.0 kg CO_2-e / Guest night (2009-10) CO_2

Project costs

Overall $8 million
Construction $5 million

Annual saving

$50,000

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History

The first European structure on this site was the Railways Hotel, built circa 1860, shortly after the founding of Melbourne.

In 1914 the hotel was purchased by the Victorian Railways Union and demolished in order to build their head office. The new building was to reflect the dynamism and strength of the organization and to serve its growing membership. Significantly, the building was built with voluntary labor, provided by the union's membership.

Costing close to £15,000, the building was designed by architect A.E.H. Carleton in a style described as 'neo-Baroque' or small scale 'Palazzo.' It was built mostly of brick, with a granite and bluestone façade and floors of New Zealand kauri pine. The terrazzo marble lined floor at the entrance is still a prominent feature of the foyer.

During its earlier life, and in particular during the time from the First World War until well after the Second World War, the union's hierarchy was devoted to the education of their rank and file members. This educational drive was shown in initiatives which would have been considered groundbreaking and progressive in their time including the establishment of a library for members and their families in 1933 and the introduction of youth programs and physical culture classes for girls in 1944. In the post-war years the Union used the building to hold English classes for the many migrants arriving in Victoria.

The building was substantially renovated and enlarged towards Little Bourke Street in 1981.

During the late 1980's the Union's membership started to decline due to a combination of new technology, the ascendancy of commercial flights for long distance travel and buses for short distance travel. Declining membership meant the building was soon too large for the union's needs.

The building was sold in 1999 to the current owners, who, in 2005 commenced building a new six storey structure at the northern end of the building and redeveloped the original section on Bourke Street.

The new building, now known as Alto Hotel on Bourke, was opened on 13 February 2006. Although many of the early architectural features have disappeared over time, the building is considered to be of state significance and was placed on the Heritage Register in 2005.

The building has retained the neo-baroque façade with its original leadlight window and the marble terrazzo in the foyer which incorporates the Australian Railways Union logo. Room 401 still has the beautiful lead-light windows that adorned the offices of the Union's Secretary.

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Background

Unity Hall, built in 1916, was bought by the current owners, Krauskopf Investments Pty Ltd, in 1999. The Railways Union that owned the building previously, remained as tenants for 18 months, until it was converted into a hotel which was officially opened as the Alto Hotel on Bourke in 2006.

When it was bought, it had no environmental features.

The hotel is a complete re-building within the original walls and the building has been extended to the rear by an additional 55 per cent. All the internal walls and the mechanical systems were built from scratch, using materials and techniques to make it more energy efficient.

The building is six storeys high with a floor space of 2800 m^2. Each floor plate is 480 m^2. High buildings on the eastern, western and northern sides protect the building. The southern façade utilises the original windows.

Ricardo and Suzanne Krauskopf, the owners of the building, had a small company that over many years built hotels in heritage buildings. They were therefore very knowledgeable about the problems facing this kind of renovation, and how to deal with them.

Heritage buildings are notoriously energy inefficient: they suck up energy and waste water and the air conditioning is usually primitive. High ceilings and large rooms take a lot more energy to cool or heat. Old buildings also tend to have very minimal or no insulation, which is a major concern for hoteliers.

The development at Alto Hotel preceded any state and commonwealth government incentives for energy efficiency. At the time, the efficiency technologies were less well known, so in many ways, the owners were pioneers in efficient building design and construction.

Objectives

The main objectives of the construction project, other than to develop an historic and commercially viable hotel, were:

- to develop an environmentally efficient building, both in the use of energy and water
- to minimise noise transfer in and around the building.

At the time of construction, there were no real measures, such as NABERS or Green Star, so the owners instituted two other energy and water efficiency measures:

- An annual EarthCheck audit under the auspices of Green Globe, which also provides a certification program. The EarthCheck Program was developed by the Australian government-funded Sustainable Tourism Cooperative Research Centre and is used widely in the tourism industry.
- An annual CO_2 audit under the auspices of the Carbon Reduction Institute. This was established in 2008 for the purpose of promoting awareness and action on climate change and provides a NO CO_2 certification program for member organisations. This program is also used widely in the tourism industry.

Planning

When the Krauskopfs set about to convert Unity Hall into a hotel, there were no efficiency guidelines, no experts available to conduct an audit, and no council or state regulations on energy and water efficiency.

The owners knew from previous experience that if noise transfer is ameliorated, then at the same time, heat transfer is lessened. For example, double glazing accomplishes two objectives: it insulates the space from external noise and it makes it easier for the air conditioning to maintain a constant temperature.

Rob Wilson of Domain Ramsay Architects was engaged to draw up the building designs. The knowledge of materials and building techniques to maximise efficiency was largely based on the research available from RMIT Sustainable Buildings.

At each stage when considering glazing, wall, floor and ceiling construction, water conservation and air conditioning technologies, the team sourced the best available technology. The architect incorporated these technologies into the plans and Villex Constructions, the builder, devised the best way of building them.

Implementation

The project followed standard construction processes however, energy and water efficiency objectives were not so well known. Although the architect was intrigued professionally and the builder was committed to the project, there was often a problem passing this enthusiasm for the environment on to sub-contractors and other workers.

Techniques such as ‘staggered stud’ wall construction and applying 18 mm thick, double sheeted plaster for walls or laying rubber on the floors were not something the sub-contractors were used to. The unusual techniques also made the job harder to cost. For example, very heavy plaster needed two people, not one person to lift it. Therefore, quotes tended to double the cost of everything irrespective of whether this was necessary or justified.

Features

Building

The interior of the original building was completely stripped, leaving just the shell of the south façade, the two side walls, the original six timber floors and the gable roof.

The original floors were made from kauri pine, and the space between each floor was about 3.4 metres. This provided more than sufficient space to provide noise and heat insulation between the floors.

On top of the kauri pine floor, the builders laid a 5 mm layer of Regupol rubber, - a sound absorbing material made from recycled tires - and above this an 18 mm sheet of yellow tongue compressed particle board. On top of all this, an underlay and then the carpets were laid. The ceilings also had a special heat insulation treatment applied in addition to a double layer of batts. The noise and heat insulation provided a more effective treatment than concrete.

The ceilings to each floor in the old renovated building were made at 2.7 m, very high by hotel standards but offering a comfortable interior. The ceilings were constructed with two layers of 18 mm plaster, topped by 10 cm of heat insulation batts, leaving another 40 cm of air space to the floor above.

The ceiling for the top floor was constructed the same as others in the building, except the air in the cavity between the ceiling and the peaked roof is extracted by passive rotating coils, and the roof exterior is coated in a white heat reflecting paint.

The interior walls were constructed using a staggered stud wall technique. This is a very effective noise and heat reduction method. It allows the insulation to be installed without touching the plaster walls on either side of the studs. The only issue is that rather than walls being 10 cm wide, they end up 21-22 cm wide. There is therefore some loss of space, but the wall achieves a 56 db reduction.

The west and north facing windows of the building were all double glazed relatively inexpensively.

The load bearing walls were constructed using a steel frame, inlaid with Hebel bricks. These bricks are very light, can be laid without using cement mortar and are excellent heat insulators.

Using these materials and techniques, the project team were able to construct highly insulated individual rooms that would require very little heating and cooling, there by saving energy.

HVAC

Many hotels do not have centralised HVAC systems. Instead, they use inverted air conditioning for each space.

At the time of construction, this technology was new and not available locally, so it had to be imported. The units are six star rated for energy efficiency.

The HVAC works on the principle that if the rooms are not occupied, the air conditioning and heating is not on.

The system deals with very low heat transfer between rooms and floors and ceilings because of the floor and ceiling insulation, the Hebel bricks and the double glazed windows. Therefore, the rooms need very little heating or cooling.

Each room is heated or cooled independently and controlled by the guest. A sensor is fitted so that 50 minutes afer a guest leaves the room, the system goes into a holding pattern where it reads the temperature of the room every 20 mins rather than every 2 minutes. When the guest leaves the room with their key card, this shuts off the air conditioning completely.

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Energy load

98 per cent of all lighting in hotel rooms is fluoro or LED, and the owners are gradually replacing the fluoro lamps with LED.

The hotel uses 100 per cent renewable electricity, which is quite expensive. This, however, is a huge driver for reducing the electricity bought. Therefore, all corridors use 15 watt fluoro lamps, although these were brought down to 12, then to 9 watt, they are now trying to reduce this further to 7 watts.

The owners hope they will find cost efficient LED lighting for the corridors as well as the rooms, as there are approximately 200 lights in the corridors, which would amount to a significant energy reduction.

No work has been done to the lifts because it was not cost effective to do so.

Water

Water efficiency was the second most important objective of the renovation, and improved efficiency has been achieved by:

- showers operating at eight litres per minute, hand basin taps at five litres per minute and sinks at six litres per minute
- toilets operate at three and six litre flushes
- hot water is heated on demand – large hot water tanks are inefficient, so the water is heated by gas units servicing a number of rooms
- a continuous recirculation system greatly reduces water wastage and reduces greenhouse gas emissions.
- rain water storage tanks are installed in the basement, and this water is used to flush the public and staff toilets and toilets in a number of the rooms.

The outcome is that usage per person per day is down to 123 litres, much better than the ‘best practice’ set for hotels, which is 240 litres per guest per day.

Waste

In the rooms, the guests are responsible for recycling using a double chamber waste bin provided for recyclable, or non-recyclable materials. This waste is then collected in two separate bags.

In the showers, no plastic toiletries (which otherwise get sent to landfill after use) are used, but instead use push button replenishable dispensers are fitted.

All organic waste from the hotel kitchen is dumped into a compost bin on the premises.

The fluoroescent lamps are recycled for their mercury content and glass, and the hotel pays a service to take this away.

The frying oil is collected and once the container is full, a collector is paid to pick it up. The oil is converted to bio diesel.

The hotel has calculated its waste to landfill. Is 3.9 litres per guest per day, which is almost 60 per cent better than best practice.

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Environment

The hotel has a 100 per cent green energy acquisition policy. This is more expensive, but contributes to their zero carbon objectives.

Building management and controls

As the heating and cooling in the building is provided by independent inverter systems, there is no need for a central building management system.

However, the building is well metered, which provides excellent data on the usage of electricity and gas, which Management uses in their EarthCheck and CO_2 audits.

Challenges

The biggest challenge was generating understanding among the sub-contractors during construction of the energy and noise reduction initiatives, and having them cost the works properly.

However, the owners believe that times have changed. The building industry, councils and governments are significantly popularising these ideas, so there is not the same resistance to implementing efficiency measures now as there was during the Alto Hotel construction.

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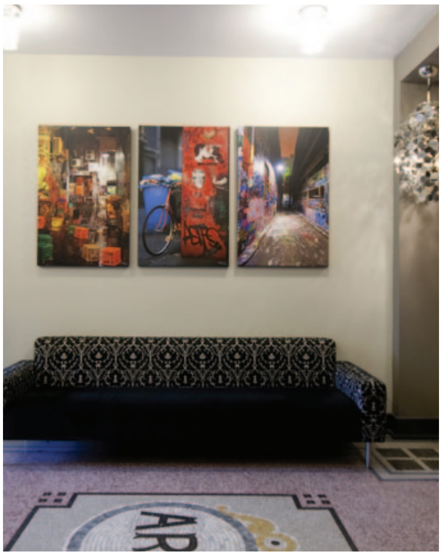

Outcomes

Energy

36 mega-joules per guest per day (78 per cent better than hotel best practice).

Water

123 litres per guest (68 per cent better than hotel best practice).

Social

The green attributes of the hotel are a credible selling point.

Maintenance

Maintenance costs are not necessarily reduced by greater use of environmental technology. In fact the outcome is often the reverse.

Commercial

The water system has yielded a significant return on investment through lower use of gas, water and energy.

Overall

The air conditioning inverter technology has been very effective, but it is the highly insulated rooms that have been most effective.

Lessons

The main lesson, which the owners believe can be applied to all buildings, is to make sure the building itself is as energy efficient as possible, before worrying about the systems required to heat and cool.

If the building is constructed in an efficient way, the technologies such as air conditioning and hot water can take advantage of this. Coupling the efficient (highly insulated) building and efficient technologies reaps rewards.

The future

Hotel management will separate the commercial kitchen's hot water from gas fired to a solar system. They cannot do this for the whole building because there is insufficient space on the roof to install enough panels.

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