

RETROFITTING PART III: SOMETHING OLD, SOMETHING NEW

There's an ecological business case for extending the life of buildings: according to US-based National Trust for Historic Preservation, research shows that it takes 35 to 50 years for a new green building to save the amount of embodied energy lost in demolishing an existing building. But sustainability is about more than that – the preservation of culture, memory and human creativity also contributes to maintaining a sense of place, essential for rooting us to this earth.

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Manuel Zühlke

Retrofitting heritage buildings is both rewarding and challenging. Heidi Zollner, head of Woodstock-based Zollner Architects, has worked on projects ranging from a conservation management plan for the entire parliamentary precinct in Cape Town to a restoration of the Groote Schuur residence.

One first has to do an analysis, Zöllner says. “One needs to work out what is being dealt with: the period, the original intention that inspired the building, etc. Some parts of the building may be more heritage-sensitive than others. For this, a heritage expert should be part of the project team.”

The heritage expert can help the owner identify original, energy-efficient features that can be restored. Older buildings often have good thermal mass and were built with climatic conditions in mind, when heating and cooling was natural: deep “stoeps” for shading, shutters that were closed in the heat of summer, wooden window frames (which reduce thermal bridges), central courtyards for ventilation and high ceilings for light and air to circulate are typical characteristics. However, it

should be taken into account the benefits these features bring don’t always meet modern comfort levels and other solutions may also need to be introduced.

Restoration is not the only option, as long as you don’t destroy the existing external features. Zöllner explains: “In German heritage buildings they put in new floors above the existing floors and run their plumbing and electrics through the gap between the two. They insulate the walls on the inside and then put dry wall over it. It is perfectly acceptable to fit a modern shell inside a heritage building, and it’s less expensive than restoration.”

An energy analysis, for which the law now requires architects to take responsibility, can help an owner decide which retrofits or restorations will offer the most benefits. The company, Integrated Energy Solutions, offers a suite of products called Virtual Environment tools, which are also offered as free Google SketchUp plug-ins for building performance analysis.

Any building or retrofitting project has its challenges, but heritage projects pose some unique

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ones. Zöllner tells the story of attempting to preserve the façade of a row of shops when developing a new shopping centre in Woodstock. The bulk of the buildings had been painstakingly demolished (the walls closest to the façade had to be chipped away by hand), when a five-day windstorm struck. “We phoned Heritage Western Cape and told them ‘You have to come and see these cracks for yourself,’” says Zöllner. They agreed that the shop fronts could not be saved.

GREENING HERITAGE BUILDINGS

Permissions: Be sure to check with the local municipality before beginning renovation or retrofitting work, particularly if it will change the exterior or roofline of the building. In Cape Town, which has a particularly well developed heritage sector, any building older than 60 years requires

permission to make building alterations, whether interior or exterior. In the case of national monuments, there may be restrictions on changing elements such as windows or plumbing: consult a heritage specialist.

Retaining character: What gives a historical building its special feel, is the evidence of time. Time doesn’t stand still, but a renovated building is far more interesting if modern touches are thoughtfully layered over the old. Try to keep the original detailing, fittings and proportions, or refer to them when bringing the building up to date.

It is important not only to consider the visual impact of, say, solar panels on the street-facing roof of a 100-year-old building, but also practical issues such as whether the roof can bear the additional weight, and if suitable replacement tiles are available if any are broken during installation.

Consider spatial conditions: Since many older homes are “rabbit warrens”, it’s common for owners to change interiors into open plans. However, overzealously knocking out internal walls can throw the home out of proportion. It may also be energy-inefficient and become more difficult to heat the space. **Materials:** Where possible, reuse materials. Modern equivalents are seldom of the same quality. Also, consider using local, salvaged woods.

The original ways to maintain homes are often the best. Sometimes this means leaving well alone: in the eighties it was considered a good idea to seal stone to prevent moisture penetration, until it was discovered that this caused a chemical reaction that made the stone deteriorate faster. Permeability to moisture is a characteristic of older materials. Lime-washed walls, though damp, must breathe and modern paints don’t allow this.

One can often simultaneously preserve heritage and go the eco-friendly route by using traditional building techniques (lime plastering, manual wood-working etc.) when making alterations or repairs.

PRESERVING BOTH HERITAGE AND NATURE

A combination of various low-impact interventions can significantly improve the energy and water performance of heritage buildings without affecting their character.

Maintenance: Often historical buildings perform poorly simply because they have been allowed to fall into disrepair. Before tacking on new technologies or making major changes, optimise existing elements such as passively designed ventilation, and fix any broken doors, windows or plumbing. If the building is of significant historical value, one may want – or



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be required by the National Heritage Resources Act – to put in place a maintenance plan developed by a heritage specialist.

Insulation: Ceiling insulation is usually easy and unobtrusive – just be sure to check or replace old electrical wiring and fittings before laying insulation over them. It is perfectly acceptable to rewire a heritage house for safety reasons. Use a breathable insulating material and don't let it touch the edges of the building where it might pick up moisture making it less effective.

Insulation is challenging in the case of tin roofs, particularly flat ones but is even more necessary in these cases. It might be worth replacing, while taking the opportunity to install a light-coloured roof to reflect heat and to lay insulation between the roof and new ceiling.

If there is a crawl space under the sprung wooden floors, it is relatively easy to install insulation: attach it to the underside of the planks using plastic chicken wire (not staples, which rust). Energy can also be saved by insulating pipes and geysers and generally plugging up drafts around the house (for

example, by installing storm shields along the bottom of outside-facing doors).

If the building is damp, dry out and ventilate correctly before insulating. Don't seal vents.

Windows: Windows that take up a large proportion of walls transfer a lot of heat – out of the building in winter, and during summer. Double-glazing dramatically increases the efficiency of windows. This can be done on some existing windows by securing in a second layer of glass with new beading but this is expensive and only partially effective. Until recently, new double-glazed wood-framed windows were not available in South Africa but Swartland has introduced them in their Cape Culture range. If replacement is not necessary or not an option then replacing cracked glass, sealing gaps or applying UV film will improve windows' performance without affecting them visually.

CASE STUDY: SATYAGRAHA HOUSE

In 2010, a unique house in Orchards, Norwood, stood unsold. More than a century old and known as The Kraal, it comprised two interlinked thatched

QUICK FIXES:

- Replace light bulbs. The wide variety of energy-efficient bulbs available today will not look out of place in more traditional fittings.
- Install energy- and water-efficient appliances.
- Install water-efficient taps or inserts to aerate the water in order to keep the original fittings.
- Service chimneys and install draft-reducing accessories like damper plates. Install a closed combustion system into the existing fireplace – it is cleaner and more efficient.
- Skylights don't change the roofline and are particularly useful in semi-detached homes, which can be gloomy. A caveat is that many older roof tiles contain asbestos. Ask the contractor how they plan to handle the fibres that will be released when they cut into the roof.
- Décor can be used to good effect: mirrors reflect light into rooms, while heavy curtains keep heat in. By refurbishing older furniture pieces, resources and energy are saved.
- Deciduous trees shade a building in summer and lose their leaves to let light and heat in during winter – don't cut them down.

“rondavels” – not the kind of home that gets snapped up in Johannesburg.

But it was not only its architectural quirks that made it special. It was built in 1908 by architect Hermann Kallenbach, a friend of Mahatma Gandhi, and Gandhi lived there until the end of 1909. It was this fact that captured the imagination of Voyageurs du Monde, a specialist French tour operator, which bought the house, which had been a family home since the 1920s, and began its 18-month conversion into a boutique retreat called Satyagraha House. “Satyagraha”, roughly translates as insistence on truth, Gandhi's philosophy of non-violent protest – an approach that shaped the history of South Africa.

Satyagraha House has been a passion project for the new owners and is primarily about preserving Gandhi's memory and promoting his beliefs. In addition to nine guest rooms, the boutique hotel includes a small public museum developed by Lauren Seagal, who also curated the Gandhi exhibition at Constitution Hill. The fact that the house has been refurbished to reduce its impact on the Earth is an extension of Gandhi's philosophies rather than a trendy marketing angle.

DRIVEN BY VISION

The project drew three very passionate people, says Bayeye: Lauren Seagal, the museum curator, Eric Itzkin, a Gandhi historian and “a key person to validate that we were progressing according to Gandhi's principles”, and Rocco Bosman, a heritage architect. “Even if Kallenbach was the original architect, Bosman (passed in February 2012) emerged as the key architect.” His work included restoration of original features, such as a canal that channelled water from a spring on the property to different parts of the garden as well as some sensitively constructed extensions. “Your renovations cannot influence the original intention of the building,” he says in a video about the refurbishment of the house.

PEACEFUL REVAMP

Eco-friendly approaches included optimisation of existing features – the fireplaces and thatched roof, for example – and installing efficient lighting. Landscaping company Athol replaced the “colonial” garden with a water-wise indigenous one, and there is an organic plot on the property that provides the produce for the guesthouse's vegetarian meals.

Instead of installing solar water heating, Satyagraha House opted for a geothermal system. This was partly because of the visual impact of solar panels on the thatched roofs and partly because of the expense. The system installed by Estoril Projects is a ground-source heat pump, drawing heat from under the earth, where the temperature remains constant, through an open system using on-site spring water. This augments the underfloor heating and the hot water geyser reducing electricity consumption by up to 70%.

The changes went beyond the green solutions. “We also worked quite hard to offer our staff conditions which are quite unusual in the hotel industry in South Africa: permanent contracts, full medical aid and a pension fund,” says Didier. “The social side of the project was very important to us.”

A clear vision has made Satyagraha House a tranquil retreat in the midst of the frenetic City of Gold. ◉

The Satyagraha House

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