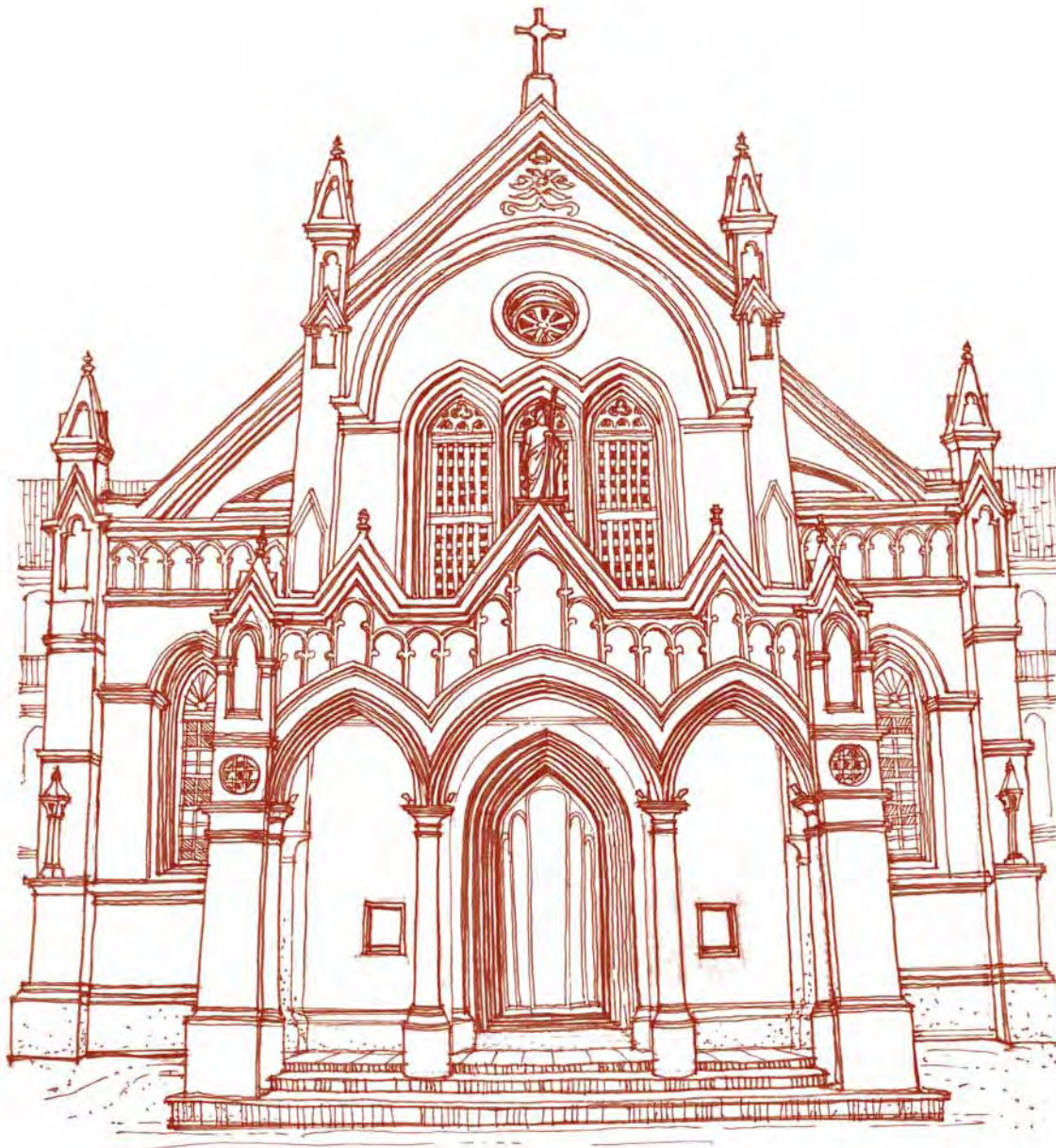


Catholic Cathedral of Immaculate Conception



2003
HONOURABLE
MENTION



City map

Opposite: *The main façade before and after conservation.*

Location

16 Caine Road, Hong Kong SAR, China

Cost

US\$1,119,100

Responsible Party

Reverend Dominic Chan

Heritage Architect

Anna Kwong, SL Lam, WC Mak

Bernard Hui, Charles Kung, TF Lo

Peter Tsui (Audio consultant)

Kevin Li, Levin Hung, Dominic Chan (Lighting consultant)

Contractor

Societe Bond (HK) and Company Ltd.

Wenden Engineering Service Ltd.

Tai Yue Engineering Company Ltd.

Pacific Construction Ltd.

Date of Completion

8 December 2002

Project synopsis

Constructed between 1883 and 1888 and in continuous use for over 115 years, the Catholic Cathedral of the Immaculate Conception is a leading centre of religious activities in Hong Kong SAR, a source of inspiration to the community and a symbol of religious diversity.

Designed by Crawley and Company of London, the Cathedral is an imposing Gothic Revival style building in a cruciform shape with a tower at the intersection of the nave and transepts. The building is constructed predominantly of bricks and stone over a granite platform and is supported by external buttresses. The Cathedral's original timber roof was replaced with a concrete roof in 1952 and the main altar was reconstructed in the early 1980s. With four main chapels, a collection of statues and relics and intricate stained glass windows, the Cathedral is a significant attraction on the Central district heritage walk. In view of its historical, architectural and cultural significance, the Cathedral was listed as a Grade I Historical Building by the Antiquities Advisory Board in 1981.

The Cathedral's conservation programme began in 1997 when major roof leakages were reported. The overall goals were to preserve the Cathedral as a living structure and ensure that the needs of the community continue to be met while enhancing the character and significance of the building. The project focused on reinforcing the structural stability of the building, restoring historic and artistic elements and improving building services. Spanning a period of five years, the project was completed in December 2002. It has revived community interest in liturgical art and architecture and has become a model for the restoration of other religious buildings.

Conservation approach

Thorough research and documentation established the historical and liturgical significance of the Cathedral before any construction plans were made. Monitoring checkpoints were set up throughout the building and underground infrared scanning was carried out to monitor changes in the water level. Defects in the structure

were analysed and an array of options carefully discussed and tested before deciding on repair methods. For instance, in repairing the roof, which was the major part of the restoration project, a waterproofing liquid membrane was applied over a section of the roof and its performance was tested for two years before it was implemented for the whole roof.

In conformity with the Venice Charter, the project removed incompatible elements in the name of architectural integrity. Specialists with traditional skills were appointed to undertake replacements and repairs using compatible materials and techniques. For example, the blue mosaic backdrop in the niche for the Statue of the Immaculate Conception that had been added during the 1980s was removed. Similarly, the railing previously installed in the grotto was removed and redesigned so as to be more compatible with the setting. Concrete paving in the front portico, sacristy and the side entrance was replaced with granite paving similar to the granite of the Cathedral pillars. This paving was laid by a specialist mason in the traditional manner. The Statue of Our Lady of Lourdes was repaired and redecorated by one of the few surviving local artisans with traditional skills in restoring statues.

So as to acknowledge the importance of Chinese martyrs and saints, the Chapel of Our Lord's Passion was renamed the Chapel of Our Lord's Passion for the Chinese Martyrs. A Chinese artist was commissioned to replace the geometric design on the stained glass windows with new images depicting the Chinese martyrs. In keeping with the character of the building, the new stained glass windows were produced using traditional stained glass techniques and craftsmanship.

In order to enhance the ambience of the Cathedral the lighting and acoustics of the building were redesigned to enhance liturgical functions. The Cathedral was zoned into different sections in order to achieve the desired lighting effects, with the main altar having the brightest lighting and indirect lighting used for the rest of the Church. Interior and exterior architectural features, such as arches, and liturgical art and statues were highlighted with lighting.

To ensure the ongoing maintenance of the structure, the *ad hoc* restoration committee was given a permanent role, charged with



overseeing regular maintenance of the building in a manner which would reduce the need for expensive future repairs, while at the same time allowing the building to develop its patina of age.

Conservation and the community

Project managers sought to ensure that all levels of the church community were actively involved in the project in order for the restored Cathedral to truly meet the needs of the stakeholders. Information about the renovation was publicly displayed and consultation sessions were held to enable parishioner feedback. Various age groups of the parish community were invited to evaluate such aspects as the lighting design and to test the illumination and acoustic levels.

A steering group was formed to appeal for donations and to organize fundraising events such as walkathons. Donations were matched on a dollar-to-dollar basis by Cheung Kong Property Development Ltd.

The systematic and sensitive approach to conservation planning and the involvement of the community has made this project a model for the restoration of other historic churches and religious buildings, as well as for the construction of new churches in Hong Kong.

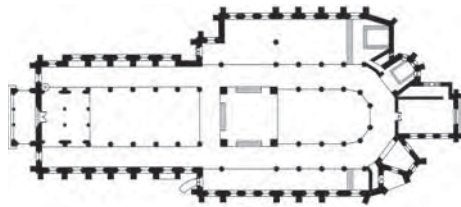
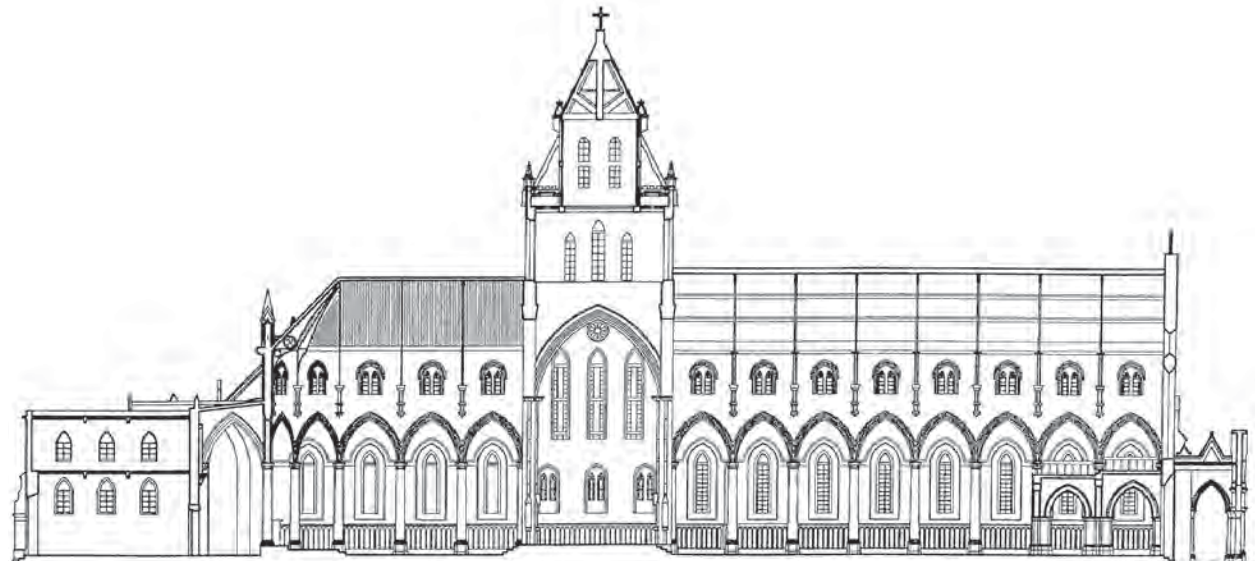


Award Citation

The preservation of the Cathedral of the Immaculate Conception has revitalized this religious landmark, which has a history of continuous use for 115 years. The non-intrusive investigation of the building and the systematic process of testing possible solutions displays technical competence and a keen understanding of the complexity of working with historic buildings. By undertaking necessary repair work and upgrading the services in the Cathedral, the conservation project has not only consolidated the physical historic fabric of the building, but has also renewed the spiritual life of Hong Kong's Roman Catholic community.

Quote from the project team

Responsibility for the care and upkeep of the Cathedral is passed onto each succeeding generation. Good maintenance begins with good housekeeping. The project reminded the church community that pro-active prevention and rectification of building defects should be based on the principle of “a stitch in time saves nine”.



Above: The Greek cruciform plan with 32 columns.

Top right: Section through the nave.

Right: Inappropriate finish was removed from the side chapels.

Far right: The refurbished altar at the nave and transept intersection.





Above: Services continued during restoration works.

Left: The new scheme provided better illumination and highlighted the interior Gothic arches.

Technical Brief

Lighting and acoustic design

The Cathedral was first illuminated by candlelight, then by gas lamps and, eventually, by modern electrical fittings, which were introduced during numerous phases of subsequent refurbishments.

Prior to the renovation of the Cathedral the lighting with respect to qualities such as uniformity, lighting level and glare control was not suitable for the ambience of liturgical ceremonies. Rather, the aesthetics of the lighting equipment appeared to have been chosen to merely meet the functional illumination requirement.

In 2001 local lighting experts were invited to submit ideas for

improving the lighting design. The lighting improvements were as follows:

- The main altar was given a dominant lux level, appropriate for the altar's position as the focus of liturgical ceremonies.
- Indirect lighting was established in the rest of the church, with a relatively low and uniform lux level.
- Architectural features such as arches, roof trusses, mouldings and the liturgical art and statues were highlighted.

After long discussion among the various stakeholders, including the parish priest, the parish community, the technical advisers and the lighting consultants, the decision was made to:

- Install high colour rendition, energy saving, and warm colour metal halide lamps for the general upward floor lighting, to create a peaceful ambience.
- Use 100% colour rendition tungsten halogen lamps for the accentuation of statues and arches.

- Use different lumination, with a variety of photometrics, to achieve the lighting effect required in the celebration of the Eucharist and other liturgical ceremonies.
- Ensure visual comfort, uniformity, low contrast, good glare limitation and energy efficiency as well as ease of maintenance.
- Choose lumination carefully so that they blended with the architecture of the Cathedral, keeping the aesthetic disruption of the fittings to a minimum.
- Arrange zoning and control to suit the various liturgical ceremonies yet put aside money for expensive and sophisticated dimming systems. The circuitry and control were arranged with the greatest care.

In September 2002, a trip to Macao SAR was organized to study the lighting effect in St. Joseph's Seminary, St. Domingo Church and other sites.

As in many large-scale churches, the Cathedral was a huge challenge for acoustic improvement as the large volume of air and extensive reflective surfaces made the church acoustically reverberant. Echoes were a common problem for the congregation as they struggled to hear the sermon and join the choir.

The most common solution, using sound absorption treatment to decrease the reverberation over five seconds (RT60 mid-band as measured), was considered inappropriate as the introduction of wall insulation panels would significantly affect the character and atmosphere of the Cathedral. This option was also expensive.

A specialist acoustic consultant was asked to assist in the design of a new system. The design objectives were:

- Control echoes to ensure clarity of speech.
- Distribute sound to ensure an even level of sound at all locations in the Cathedral.
- High quality audio products of neutral character to keep the visual impact to a minimum.
- Ensure the new audio equipment would cause least intrusion in the Cathedral and be reversible.

The suggested solution was to use the line array principle to focus a wide but very flat energy pattern so as to concentrate the sound

and to limit the energy spilling into the upper part of the church where large reflective wall surfaces would reflect unwanted sound energy. The two line array column speakers, each consisting of 12 small speakers, were set up at the main columns in front of the main altar at listener's ear-height to test if the system would meet the requirements before commissioning the audio expert. The church community and priests were invited after the Sunday mass to see and listen to the test performance and evaluate its possible effects on the historic building.

To devise an optimum design for the sound system, acoustic modeling computer programs were used. A complete computerized 3D model of the interior of the Cathedral acoustics was built and different audio system design approaches were tested. The sound levels and speech intelligibility of the Cathedral were recorded at all spots and inputted into the model for comparison. Parish priests and members of the repair committees were invited to the audio studio in December 2000 to speak into the microphone, hear the simulation and compare the different designs according to different speakers placements, before ordering the audio equipment.

With the system installed, the results have proven consistent with the computer simulations and the effect of reverberation has been reduced dramatically, thus achieving the required speech intelligibility.

*Adapted from "Catholic Cathedral of the Immaculate Conception"
UNESCO Asia-Pacific Heritage Awards entry submission*



Top, middle, above: *Lighting schemes for the interior and main façade were modeled using computer programs.*