

Restoration To The Main Temple Building of The *Cheng Hoon Teng* Temple

By Ir. Tan Hoon Keong



Turtle hump roof

Prayer Pavillion

After a dilapidation study on the 400-year old *Cheng Hoon Teng* Temple, restoration work on the main temple building commenced in April 1999 and was completed in December 2000. All engineering works were carried out by local contractors while the intricate mouldings and carvings were done by artisans from China.

This feature highlights the challenges faced while restoring several roof structures that were damaged by termites and water leaks. It included restoring termite-infested secondary roof ridges and replacing beams with those protected by anti-termite chemicals and cooper sleeves. Dexterity, co-ordination and patience were necessary for the successful restoration.

The *Cheng Hoon Teng* Temple is the oldest Chinese temple in Malaysia with its origins dating back to the 1600s. It is also the only temple that is protected by an Act of Parliament.

Over the years, its had expanded, changed and transformed to its present form in 1801. Between 1801 and 1962, there were several repairs done but all on an ad hoc basis.

In mid 1997, the Trustees of the *Cheng Hoon Teng* Temple Incorporated,

alarmed by the condition of the temple's roof, commissioned a conservation architect to conduct dilapidation study in the main temple building with the intention of carrying out complete restoration work. The urgency to restore the temple was further fuelled by the collapse of a beam at one of the side bays. The dilapidation study was completed in August 1997 and the restoration work eventually commenced in April 1999 and was completed in December 2000.

All the engineering works were carried out by local contractors while the intricate mouldings, wood carvings, cut and paste porcelain works, gold gilding works, etc. were done by skilled artisans from China. Strict conservation rules were adhered to throughout and on site engineering decisions were made to resolve specific problems encountered.

Hoisting of Broken Secondary Ridges

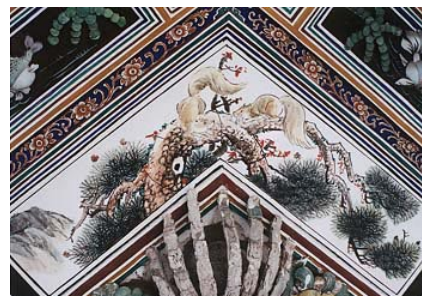
The main temple building comprises three bays of equal span. The central



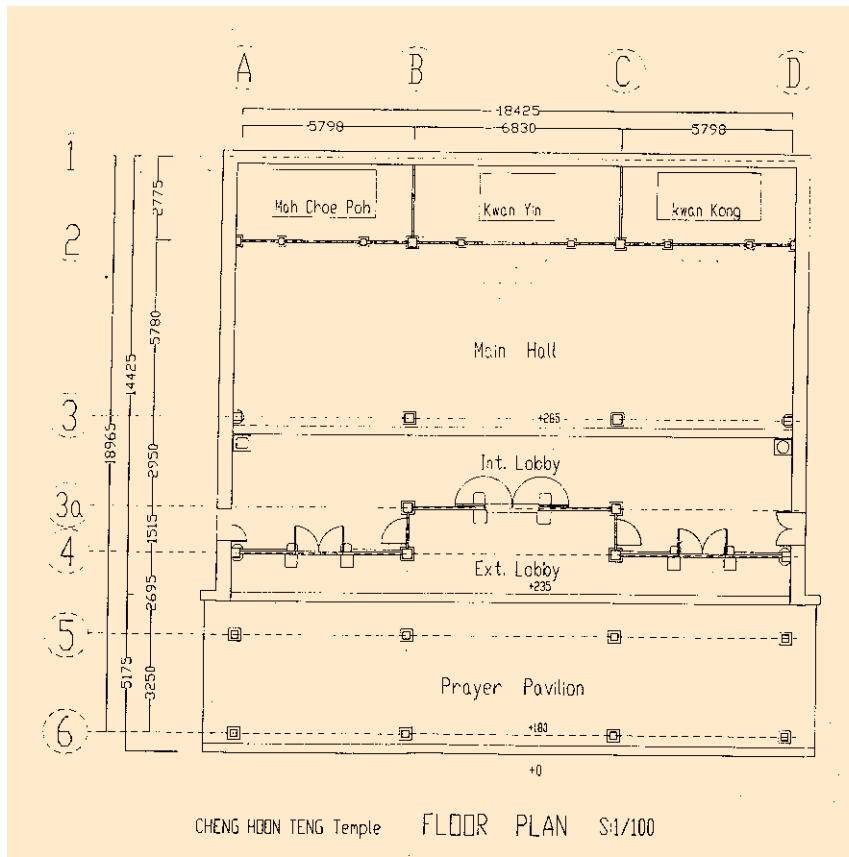
Gold-gilded Dragon doors



Cut & Paste Porcelain figurine



'Chai Hui' - decorative paintings



Floor plan of main prayer hall

wooden battens. Both the main ridge and the secondary ridges are constructed using lime mortar and broken bricks.

All the sloping secondary ridges cracked at the column support positions as a result of failure of the supporting battens due to termite attack. Miraculously the main ridge remained intact throughout, as the oval-shaped beams that supported the main ridge were all unharmed by this voracious pest. Applying the principle of conservation, the restoration committee decided that these sloping ridges should be restored and not remoulded (see Table 1).

In order to remove the termite-infested beams, an *in-situ* hoisting frame was fabricated. It consisted of heavy-duty mild steel hollow sections, which was then strategically tied to the existing temporary supports for added stability. Four chain blocks were then installed, one at each corner of the frame.

The lower cracked section was carefully lifted by about 1" to facilitate the removal of the decayed beam and



Hoisting Frame

Table 1 Restoration Committee, Consultants and Contractor

Restoration Committee	Ir. Tan Hoon Keong – Project Engineer Md. Chua Lay Choo, Josephine – Project Co-ordinator Ir. Chan Kien Keong Ir. Lee Eng Cheow Mr. Tiong Kian Boon – Architect
Consultant Architect	M/s Laurence Loh Akitek
Contractors	M/s Success Construction Sdn Bhd

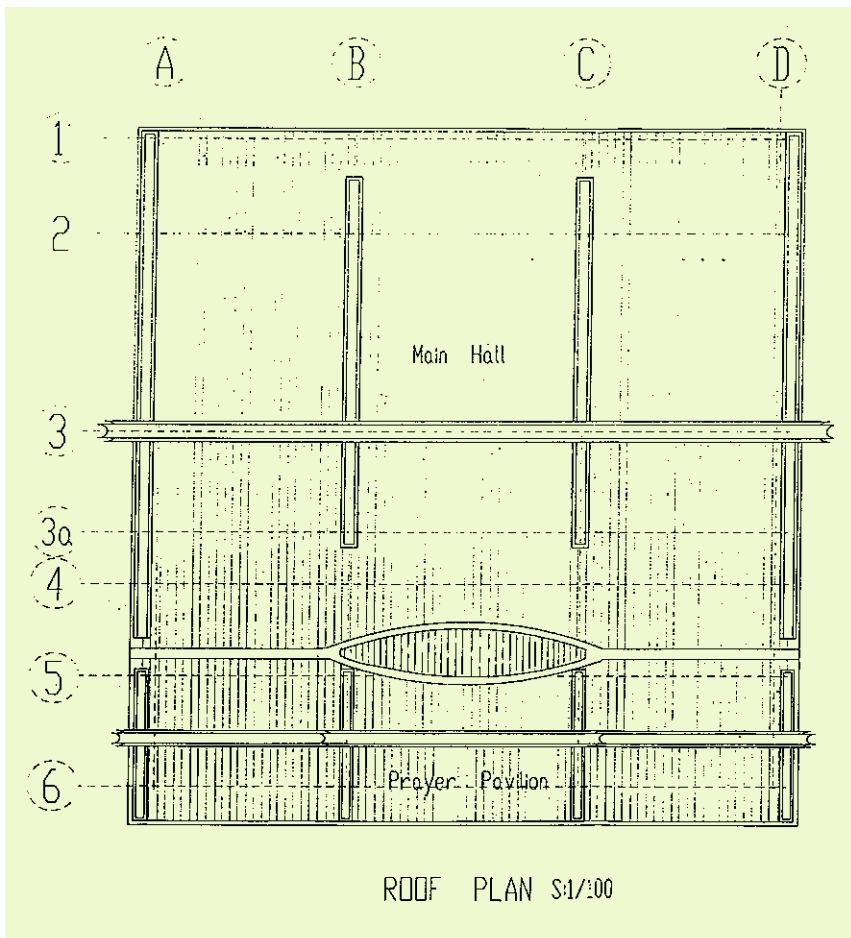
bay houses the main deity, the Goddess of Mercy, *Kuan Yin* while that on the left is for the Goddess *Mah Choe Poh* and that on the right is for the deity *Kuan Kong* (see floor plan of main prayer hall).

The temple's roof structure comprises of a main ridge and four secondary sloping ridges (see roof plan). The main ridge sits on huge oval-shaped wooded beams while the sloping secondary ridges sit on a 2" x 1"

the other structural members. The replacement of these members proved to be more difficult than anticipated due to the complexity of the joints. Indeed it required a lot of dexterity, coordination and patience to install these interactive structural members within a confined space .

The replacement of the 2" x 4" batten beneath the sloping ridge proved to be as challenging. The restoration committee decided to strengthen this batten to avoid similar failure of the sloping ridge in the future.

A piece of heavy-duty mild steel c-channel was first sand-blasted and then coated with anti-rust paint. This c-channel was then placed snugly above the batten. Some 1" diameter stainless steel studs were also welded to the c-channel to provide additional grip



Roof plan

between the secondary sloping ridge and the “reinforced” batten.

The sloping ridge was subsequently lowered onto the “reinforced” batten and the cracks were then sealed with non-shrinkage grout and lime mortar.

Beam Replacement

It was found that most of the beams were attacked by termites from the end that were embedded in the walls. The restoration committee recommended that all the ends of the new beams be protected by a coat of anti-termite chemical and the embedded ends be protected further with copper sleeves. Copper was chosen because it is a natural wood preservative. This was confirmed when it was discovered that some old beams had copper sleeves and some with galvanised iron sleeves. The ends of these beams with copper sleeves remain intact while those with galvanised iron sleeves had decayed substantially.

“Turtle Hump” Roof

The roof of the main prayer hall is connected to that of the outer prayer pavilion by a “turtle hump”. This is an ingenious way of channelling the rainfall to both ends of the gutter and out through the mouth of a mythical creature called “Hou Yee”. The turtle hump thus flushes the rainwater and thereby eliminates water stagnation.

The rain gutter was constructed entirely of lime mortar and broken pieces of tiles and bricks. The gutter was supported by a 8” x 9” wooden beam. This mode of construction had over the years, caused the gutter to deteriorate and hence exacerbated the decay of the beam. The importance of the gutter prompted the restoration committee to replace it with a copper gutter. This effectively solves the leakage problem and prolongs the life span of the gutter beam.

Conclusion

The restoration to the main temple building of the *Cheng Hoon Teng* Temple marks the beginning of a bold initiative by the Trustees of the *Cheng Hoon Teng* Temple to carry out a comprehensive restoration of the entire complex. Among the buildings earmarked for further restoration are the front gateway, the side wings, the rear wing and finally the opera theatre. All these works will be financed by generous donations from the public and devotees. **BEM**



Replacement of Decayed Interactive Structural Members



Decayed Beam End



Copper Sleeve to Beam End