



An Underground Basilica

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MY wife and I made a pilgrimage to the Sanctuary in Lourdes, which is over 300km southwest of Paris, France. Here, in a natural grotto in Massabielle Rock on the banks of Gave de Pau at the foot of the Pyrenes, the 18 Apparitions of Virgin Mary before 14-year-old shepherdess Bernadette took place from 11 February to 16 July 1858. The spring water from a hole dug by Bernadette has been flowing ever since.

Pilgrims find purification of their bodies and souls with the spring water. Over 6784 healings have been claimed. However, only 67 have been officially recognised as miraculous by the Church authorities after many years of investigations. The whole Sanctuary has a total of 22 churches and shrines of worship and prayer, and 6 million visitors went yearly.

A particularly interesting engineering structure is the huge underground Basilica of St. Pius X built for the 1958 centenary of the Apparitions. The architect Pierre Vago planned a 12,600m² elliptical shaped (191m long and 61m wide) structure with no internal columns to accommodate 25,000 worshippers. The ceiling is low at only 10m high. The concept reflects an upturned ship (recalling of the Noah's Ark of biblical description).

The structural design of the Basilica building certainly presented many challenges to the engineer Freyssinet. The main structural frames consist of 29 portal frame-like structures with side cantilever overhangs. The side sloping columns have pin-jointed supports at the column bases.

The engineering design is further complicated by the fact that the top chords of each frame are not in the same plane as the sloping columns and the very long span requirement. Invariably, reinforced concrete and the then state-of-the-art prestressed concrete structural systems (obviously using the Freyssinet system) were adopted for the construction. The concrete surfaces were left bare.

During our visit, now some 51 years after the Basilica's completion, it was observed that the concrete structure appeared to be in very good, stable structural and good material condition. This certainly is truly reflective of the



The 25,000 capacity underground St. Pius X Basilica



The 3-in-1 main shrine of the Lady of Rosary Basilica, the Crypt and the Basilica of Immaculate Conception near the Grotto and beside the River Gave

fundamental axiom that good, stable, durable concrete structures can be built if proper engineering design and good quality construction controls using appropriate materials are adhered to.

Nowadays, pilgrims, including those who are sick and physically challenged, travel to the Sanctuary in Lourdes to accomplish a simple act of faith, finding in their pilgrimage moral strength, hope and brotherhood. Most left with a greater sense of peace, inner healing and heightened sense of spirituality. To many, these would be everyday miracles. ■