



The Hong Kong Institution of Engineers

**First announcement**

## **5-DAY HERITAGE FIRE SAFETY VISIT TO XIAMEN IN FUJIAN & JINMEN IN TAIWAN**

Organized by  
Fire Division, Hong Kong Institution of Engineers

Date:	19 Nov to 23 Nov, 2014
Venue:	Front entrance of Ideal Hotel, Kowloon Tong, Kowloon
Time	To be advised

### **Scope and Objectives**

Buildings with historic values represent living emblems of the past and should be sustainably survived by conservation through preservation and/or adaptive re-use. Meanwhile, people are becoming more aware of the historic values and treat these old or ancient buildings as common heritage. While we are all obliged to share the responsibility in safeguarding them for our future generations, various building professionals and stakeholders (i.e. architects, engineers, surveyors, conservationists and regulators, etc.) should collaborate hand in hand in preserving them in their full richness of authenticity as far as practicable.

Heritage buildings are generally constructed of conventional timber and masonry construction materials. As we may know, the use of timber in structural application involves timber species identification/visual strength grading and justification of fire resistance rating; whereas masonry is built of granite blocks adhered together by cement-sand-lime mortar.

Timber is strong in strength with fire resistance rating though it is combustible, which is crucially fatal when being challenged in failing to provide non-combustible means of escape route. Limited combustibility of timber should be visited in accordance with Eurocode. The strength of unit masonry block is governed by the cement-sand-lime mortar, which can be acquired by means of the chemical composition of cement, sand and lime. The characteristics of these conventional construction materials and the principles of conservation and adaptive re-use would be covered in the heritage workshop. When these buildings undergo revitalization that may involve change of use, it normally creates hardship in compliance with the current safety requirements, particularly fire, structural, barrier free access for disabled and protective barrier aspects. The hardship can always be overcome by means of performance-based design approach.

Visiting a world-class scenic spot and gazing upon these heritage buildings invariably brings refreshment for the soul, which can evoke collective human memories and can deeply touch one's innermost being. The Fire Division of the Hong Kong Institution of Engineers arranges a 5-day interactive heritage visit to world-class heritage Tulou in Xiamen and historic relics in Jinmen, Taiwan.

To this end, we are very honoured to invite Professor Alex YEN Ya Ning, the head of Department of Architecture at the Taiwan University of Technology, as our expert guide of the heritage visit at Jinmen. Prof Yen would also endeavour to invite Professor DAI Zhi Jian of Xiamen University to conduct heritage visit at Fujian.

Through the atmosphere cultivated in this heritage fire safety visit, we believe the participants could foster friendships and promote exchanges of their expertise in heritage conservation and adaptive re-use.

**Official Language**

Putonghua and Chinese language will be the official language. The registration fees are devised below, please make your reservation as soon as possible.

<b>Programme</b>	<b>Fire Division Committee Member</b>	<b>HKIE member</b>	<b>Non member</b>
5-day Heritage Fire Safety visit	2,600	3,950	5,200

The registration fees include 12-hour CPD certificate, workshop notes, meals as stated in the itinerary, transportation, hotel accommodation (shared room) and honoraria to academic professors. For participant requesting single room hotel accommodation, an additional fee of \$1,100 would be imposed.

Should you have further query, please do not hesitate to contact Ir George Lam at [georgelam1868@gmail.com](mailto:georgelam1868@gmail.com).

# 5-DAY HERITAGE FIRE SAFETY VISIT TO XIAMEN IN FUJIAN & JINMEN IN TAIWAN

## REGISTRATION FORM *(To be replied on or before 15 September 2014)*

Please follow the 2-step registration procedure:

1. Email the completed registration form to Ir George Lam (georgelam1868@gmail.com) for preliminary registration.
2. Post the completed registration form within 7 days together with a crossed cheque payable to **Fire Division, The Hong Kong Institution of Engineers** on or before the deadline.

To: Ir George Lam

Email: goergelam1868@gmail.com

Personal Details:

Title	Name in full (Block Letter)	Name of Company	Tel.	Fax	E-mail address	Institution/ Membership No.
1.						
2.						
3.						
4.						
5.						

Item	Total no. of registration	Sub-total
1. Fire Division Committee Member	_____ person(s)	= HK\$ _____
2. HKIE Member	_____ person(s)	= HK\$ _____
3. Non-member	_____ person(s)	= HK\$ _____

Postal Address  
(for official receipt):

\_\_\_\_\_

I enclose a crossed cheque (no. \_\_\_\_\_ ) with a sum of HK\$ \_\_\_\_\_ for the registration fee of the captioned Heritage Fire Safety Visit.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

# 福建廈門、台灣金門

## 5天 - 歷史建築 消防安全 及 保育 之旅

日數	行程
DAY 1	<p style="text-align: center;"><b>19 Nov 2014 (週三)</b></p> <p>8:30am 香港 九龍塘 港鐵站 理想酒店 旁 登記 乘 車到 深圳高鐵北站 乘高鐵 到 福建 廈門</p> <p>午餐： 高鐵上自理</p> <p>入住酒店</p> <p>下午： 廈門市觀光</p> <p>晚餐： 廈門風味 - 當地餐廳</p>
DAY 2	<p style="text-align: center;"><b>20 Nov 2014 (週四)</b></p> <p>8:00am 早餐： 酒店早餐</p> <p>9:00am 歡迎 廈門大學 - 戴志堅 教授</p> <p>9:15am -10:45am 去 &lt;華安二宜土樓群&gt;</p> <div data-bbox="376 965 1166 1234" style="display: flex; justify-content: space-around;"></div> <p>午餐： 土樓農家風味- 當地餐廳</p> <p>4:30pm 回程廈門</p> <p>7:00pm 謝師宴- 客家風味晚飯 - 當地餐廳</p> <p>&lt;華安二宜土樓群&gt;</p> <p>從聞名遐邇的土樓群，就似乎越來越顯出一種土樓明星相。土樓形態豐富，有常見的方形、圓形土樓，還有圍裙形、曲尺形土樓，最獨特的是還有浙杭水鄉模式單院式土木、磚木結構的吊角樓，形成大樓帶小樓、高低錯落佈局的奇妙景觀。</p>
DAY 3	<p style="text-align: center;"><b>21 Nov 2014 (週五)</b></p> <p>8:00am 早餐： 酒店早餐， 酒店退房</p> <p>鼓浪嶼觀光（午餐： 中式料理 - 當地餐廳）</p> <p>傍晚 乘船到 金門（約1小時）</p> <p>歡迎 台灣科技大學 - 閻亞寧 教授</p> <p>晚餐： 金門風味 - 當地餐廳</p> <p>入住酒店</p>

<b>DAY 4</b>	<b>22 Nov 2014 (週六)</b> 8:00am 早餐：酒店早餐 金門 文物建築參觀- 閻亞寧 教授 午餐：金門風味 - 當地餐廳 金門 文物建築參觀- 閻亞寧 教授 晚餐：謝師宴 - 金門風味 - 當地餐廳 文物建築交流
<b>DAY 5</b>	<b>23 Nov 2014 (週日)</b> 8:00am 早餐：酒店早餐；酒店退房 金門島上 參觀 約早上 11:30am 點離開 金門（乘船約 1 小時）到 廈門 午餐：廈門風味 - 當地餐廳 廈門(乘高鐵)~深圳北站 回 香港 解散

### Fujian Tulou (extracted from Wikipedia)

**Fujian Tulou** (福建土樓; "*Fujian earthen structures*") is a type of Chinese rural dwellings of the [Hakka](#) is in the mountainous areas in southeastern [Fujian](#), China. They were mostly built between the 12th and the 20th centuries.

A tulou is usually a large, enclosed and fortified earth building, most commonly rectangular or circular in configuration, with very thick load-bearing [rammed earth](#) walls between three and five stories high and housing up to 80 families. Smaller interior buildings are often enclosed by these huge peripheral walls which can contain halls, storehouses, wells and living areas, the whole structure resembling a small fortified city.

The fortified outer structures are formed by compacting earth, mixed with stone, bamboo, wood and other readily available materials, to form walls up to 6 feet (1.8 m) thick. Branches, strips of wood and bamboo chips are often laid in the wall as additional reinforcement. The result is a well-lit, well-ventilated, windproof and earthquake-proof building that is warm in winter and cool in summer. Tulous usually have only one main gate, guarded by 4–5-inch-thick (100–130 mm) wooden doors reinforced with an outer shell of iron plate. The top level of these earth buildings has gun holes for defensive purposes.

A total of 46 Fujian Tulou sites, including Chuxi tulou cluster, [Tianluokeng tulou cluster](#), Hekeng tulou cluster, Gaobei tulou cluster, Dadi tulou cluster, Hongkeng tulou cluster, Yangxian lou, Huiyuan lou, Zhengfu lou and Hegui lou, have been inscribed in 2008 by [UNESCO](#) as [World Heritage Site](#), as "exceptional examples of a building tradition and function exemplifying a particular type of communal living and defensive organization [in a] harmonious relationship with their environment".

The layout of Fujian tulou followed the Chinese dwelling tradition of "closed outside, open inside" concept: an enclosure wall with living quarters around the peripheral and a common courtyard at the centre. A small building at the center with open front served as an ancestral hall for ancestry worshipping, festivals, meetings, weddings, funerals and other ceremonial functions. Ground floor plan includes circle, semicircle, oval, square, rectangle, and irregular pentagon.

The foundation of tulou building was built with paved stones on top of compacted earth ground, in two to three tiers. There is a circular drain around the top tier foundation to prevent rainwater from damaging the tulou wall.

In most cases, the weight bearing outer wall of tulou consists of two sections, the lower section is built from cut stone blocks or river cobbles held together with a lime, sand and clay mixture to

a height of about one or two metres, depending upon the regional flood water level. The compacted earth wall stacked on top of the stone section. The construction of earth wall from compacted earth mixed with sticky rice and reinforced with horizontal bamboo sticks was described first in [Song dynasty](#) building standard the [Yingzao Fashi](#).

The walls were built inclined toward the centre, such that the natural force of gravity pushes the wall together. This inward inclination method was also used in the construction of [Pagoda of Fogong Temple](#). The thickness of the Tulou wall decreases with height as specified in Yingzao Fashi. The bottom two storeys of tulou are solid with no window nor gun hole, windows are open only from the third to fifth storeys, because rooms at the bottom storey served as family storage rooms and the upper storeys were living quarters.

The rooftops were covered with baked clay tiles, arranged radially;  $\lambda$  insertion technique was used at regular intervals to compensate for larger circumference at the outside. (Majority of roof tiles were laid from top to bottom, the gap caused by radial layout was compensated by small sections of tiles laid in  $\lambda$  shape inserts). This technique allowed the tiles to be laid radially without visible gaps, and without the use of small tiles at top, larger tiles at bottom.

The eaves usually extend about two metres, protecting the earth wall from damage by rainwater pouring from the eaves.

The wooden frame supporting the rooftop had no [dougong](#) elements common in traditional Chinese building.

Circular corridors from 2nd to uppermost level were made of wood boards laid on horizontal wooden beams with one end inserted into the earth wall. The corridors are protected with a circle of wooden railings.

Stairwells are distributed evenly around the corridors, four sets of stairwells being the usual number. Each stairwell leads from ground floor to the highest floor.

Public water wells in groups of two or three are usually located at the centre court; more luxurious tulou has in-house water well for each household in ground floor kitchen.

Housing for a community of equals



Hekeng tulou cluster ([Shuyang Town](#), Nanjing County)

Unlike other housing types around the world with architecture reflecting social hierarchy, Fujian Tulou exhibits its unique characteristic as a model of community housing for equals. All rooms were built the same size with the same grade of material, same exterior decoration, same style of windows and doors, and there was no "penthouse" for "higher echelons"; a small family owned a vertical set from ground floor to "penthouse" floor, while a larger family would own two or three vertical sets.

Tulous were usually occupied by one large family clan of several generations; some larger tulou had more than one family clan. Besides the building itself, many facilities such as water wells, ceremonial hall, bathrooms, wash rooms, and weaponry were shared property. Even the

surrounding land and farmland, fruit trees etc. were shared. The residents of tulou farmed communally. This continued into the 1960s even during the people's commune period; at that time a tulou was often occupied by one commune production team. Each small family has its own private property, and every family branch enjoys its privacy behind closed doors.

In the old days, the allotment of housing was based on family male branch; each son was counted as one branch. Public duties such as organization of festivals, cleaning of public areas, opening and closing of the main gate, etc., was also assigned to a family branch on a rotational basis.

All branches of a family clan shared a single roof, symbolizing unity and protection under a clan; all the family houses face the central ancestral hall, symbolizing worship of ancestry and solidarity of the clan. When a clan grew, the housing expanded radially by adding another outer concentric ring, or by building another tulou close by, in a cluster. Thus, a clan stayed together.

Nowadays newer housing with modern facilities is popping up in rural China. Many residents have bought more modern houses and moved out, or live in a larger town or city for better jobs. However they keep their ancestral tulou apartment homes under padlock, only returning home during festival for family reunion.



### Intersecting cultures at Kinmen

In the many desolate dwellings and ancestral shrines of the island one can still find well-preserved carvings and wall adornments, executed in a refined, lively manner. While the Kinmen National Park Headquarters has taken over the management of certain historically significant sites with the intent of rebuilding or restoring them, the vast majority of sites remain in a state of disrepair as they await funds for restoration.

On a small hill stands a grave mound from the Ming dynasty. Despite the passage of more than 400 years, the site—from the mortuary stele, stone offering table, and pavilion in front of the gravestone, to the carved stone animals that flank the pathway and serve as a mark of official rank—is reasonably well preserved. No tourist signs could be found there, just clumps of weeds and cowpats, joyful testament to the fact that this place has not been disturbed by overdevelopment from tourism. According to Chiang Po-wei, assistant professor at the Kinmen campus of the National Kaohsiung University of Applied Sciences and a longtime Kinmen researcher, the island has been able to preserve its traditional settlements and architecture to a high degree. Indeed, its village settlements may be considered the last "gene pool" for Southern Min architecture, manifested in the red-tile-roofed dwellings that may be found everywhere here.

According to Chiang, the technical difficulties that attend the production of red tile, originally invented by the Romans, should not be underestimated. For tiles to emerge from the kilns red, they must be rapidly cooled down from a temperature of 800-1000°C. If the cooling takes too long, the tiles turn black, which is the typical color of roof tiles in Japan and Korea. In Kinmen, whose native granite makes a common and convenient building material, red tile is an expensive material out of reach of most ordinary folk.

In the early years, Quanzhou in Fujian Province was a conveniently accessible international trading port, and there large amounts of the needed raw materials were imported from the Arab world, which at the time possessed the most advanced technology for the production of red tiles. Red tiles subsequently became a symbol of the unique Southern Min architectural technology of Fujian and Taiwan.

## **Communal villages at Kinmen**

Traditional Kinmen clan villages exemplify the preservation of ethnic bloodlines on the island. They were settled on the model of the communal village, with a large ancestral shrine in the center of the village that would serve as a focus of activity. On wooden tablets kept in the shrine would be recorded all of the glorious achievements of the clan, such as success in civil service exams, attainment of high office, and resplendent careers. Every year the families in the villages, who collectively maintained the ancestral shrine, would work together to fund vital activities such as the annual ancestral sacrifices and winter solstice festivities. In the early days, villagers would even erect storefronts by the shrine that would be rented out, thus providing funds for the shrine's upkeep. At the shrine of the Huang Clan in Houputou the two annual rites are still carried out, and have become important local festivals.

Having inherited the complex ritual protocol of the Han Chinese, the inhabitants of Kinmen also developed their own communal guidelines based on clan-based ethical principles. For example, there is a custom of "building against the mountain and facing the water," referring to the way a house is built against a slope as a shelter against the wind, and with the water situated at a lower elevation to provide a convenient supply for irrigation and household needs.

Buildings had to strictly abide by ancient taboos against building in front of the temple or behind the ancestral shrine, or against having the height of one's house exceed that of the ancestral shrine. The reasons for such restrictions was that the temples needed open spaces in front for activities, while the ancestral shrines, symbolizing the origin and coming together of the clan itself, occupied a high place from which to watch over clan descendants. As a mark of respect to the ancestors, the lower-ranking living family members dwelt in front of it, with buildings increasing in height to correspond to familial rank. Moreover, the height, form, layout, and number of buildings of subsequent clan members could not exceed those of the ancestral shrine. Such were the unique spatial ethics of the place.

The Kinmen National Park Headquarters oversees 12 key villages among the 168 clan villages on the island. The most famous of them all is the settlement at Chiunglin, over 800 years old and renowned for the cultural and martial achievements of its native sons.

In the grand ancestral hall at Chiunglin are enshrined six "presented scholars," who passed the imperial exams, six "recommended men," who passed the provincial exams, 15 "tribute scholars," who advanced to the imperial university, six military generals, and hundreds of national academy students and local scholars. The shrine is adorned with inscriptions such as "Scholarly Brethren" and "Soaring Achievement." This is a true Kinmen landmark.

## **The emigre spirit**

On one side of the village stands a tidy row of grand old houses that are not inferior to modern mansions. It turns out that these structures-nine Min-style buildings supported on 18 massive beams-were built in the reign of the Qianlong emperor (1736-1796) of the Qing dynasty by Kinmen resident Huang Shao-kuang. After attaining success in the civil service exams, he took the money that his mother had borrowed, intending to "purchase" an official position, and built these grand dwellings. All nine of the buildings were erected together and they still stand today, more than 250 years later. They predate the master-planned settlement of Shanhou by 120 years. While the traditional settlements of Kinmen have a long history, the Western-style mansions among them tell a different story.

After the Opium Wars of the 19th century, the Qing government was forced to open five treaty ports along the Chinese coast. Among these, Xiamen, with its proximity to Kinmen, attracted many Kinmen residents who sought their fortunes in Southeast Asia, many beginning as coolies but slowly earning money and building businesses. Those who made

it rich in foreign lands not only sent back money to build houses on Kinmen but also introduced architectural trends from the places they had dwelt in. Based on their memories of architectural forms there, local builders used local materials to build these Western-style mansions.

These dwellings, which combine Chinese and Western architectural elements, exhibit much stylistic intermingling. In a hall set aside for devotion to Mazu and the ancestral tablets, for example, one can find chubby angels adorning the walls and the roofs. One also finds turbaned Indians, which indicates not that the owners had friends from India, but that they imitated the British custom of portraying their servants on the walls of their homes as a show of status. Some of these Western-style mansions have clock faces carved in the walls that invariably display the time as being 12:30. This represents the ancestors' hopes that their descendants be industrious, working hard even when others were taking their breaks.

### **Underground networks at Kinmen**

Aside from the Southern Min villages and the Western-style mansions built by emigres, Kinmen was long prized as a strategic military site by the naval powers of China, Japan, and Europe from the early Ming dynasty. Set among the early traditional buildings can be found trenches, observation platforms and battery towers built to defend against thieves and incoming bandits.

Kinmen's battle scars reached a high point in the aftermath of the civil war between the Nationalists and Communists and the Nationalist retreat to Taiwan. At the entrance to the village at Peishan is still preserved a bullet-scarred mansion, a corner of it reduced by artillery to ruins. This site is a testament to the intensity of the Kuningtou Battle of 1949, by which Taiwan took a step forward to finally gain a measure of stability.

With long-term tensions across the Taiwan Strait, underground passageways and command centers were built under Mt. Taiwu and small passageways were carved out along the seashore. To guard against artillery bombardment from the other side, the army created an "underground Kinmen," creating such battle-ready spaces as tunneled passageways, fortifications, and operations centers. Moreover, underneath the main settlements were dug extensive passageways. Notably, underneath the village at Chiunglin was formed a unique network of passageways. All residents, whether male or female, young or old, had to undergo mobilization, organization and training by civil defense authorities. The community center was later turned into an operations center, and throughout the village were set up 12 emergency entrances to form an effective defensive network.

These historic, formerly secret defense systems have now been turned into a popular "tunnel experience" for tourists. What is surprising, however, is that Kinmen, long under military administration, never had housing settlements for military families. Rather, a handful of former soldiers ended up marrying local women and were absorbed into Kinmen village life.

Kinmen has passed through periods of splendor as well as times of war, but has retained a cultural heritage characterized by its richness and completeness. Many scholars thus hope that Kinmen can be made a UN World Heritage Site. Through the mediation of scholars and experts, moreover, efforts have been made to transfer worthy historic sites to the purview of the county government to fund their restoration. However, many historic sites in dire need of restoration still languish, either for lack of funds or because their owners cannot be found to do the application.

Director of Center for Cultural Heritage  
( 規劃與設計學院－建築研究所－研究發展處 )  
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## 簡歷



閻亞寧教授

現任：中國科技大學建築系副教授

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- ◆ 現任中國科技大學文資中心主任、中國民居學會學術委員會委員、中華民國建築學會理事、中華民國文化資產維護學會理事、中華海峽兩岸文化資產交流促進會常務監事、內政部古蹟審查委員會委員、文建會歷史建築審議委員會委員。
- ◆ 專長建築史、城市史、古蹟保存、建築設計等。

### 中心目標

本中心之設置將以社會需求為主要導向，基於本校團隊暨有經驗與研發功能，結合社會資源，採整合型的觀念操作，俾能達到整合理論研究、應用技術研究及產業推廣輔導等主要目標：

- 文化空間保存再利用與產業經營管理與整合研究
  - 文化空間保存與再利用理論研究
  - 文化空間產業經營理論研究
  - 文化空間保存再利用與產業經營的整合理論研究
- 文化空間保存再利用與產業經營分項技術研發
  - 文化空間保存再利用分項技術研發
  - 文化空間產業經營分項技術研發
  - 文化空間保存再利用與產業經營整合技術研發
- 文化空間保存再利用與產業經營技術訓練與教育推廣
  - 專業證照制度規劃
  - 專業技術之產業合作

- 相關院校與產學界的整合推廣與輔導
- 文化空間保存再利用與產學經營技術網路建置
  - 文化空間保存資訊之搜尋
  - 文化空間再利用資訊之搜尋
  - 文化空間經營管理之作業程序和方法
  - 互動式的網站資訊交換模式

## 戴志堅教授（簡介）



毕业于华南理工大学建筑学院建筑历史与理论专业，工学博士。主要从事建筑设计、传统民居、闽台建筑文化理论研究等工作。现为厦门大学建筑与土木工程学院教授、教授历史学科带头人，兼任华侨大学和福州大学教授、硕士生导师，福建工程学院建筑与规划学院建筑学学科带头人。

发表《福建传统民居的地方特色与形成文脉》、《福建客家土楼形态探索》、《地域文化与福建传统民居分类法》、《闽海系民居研究的进程与展望》、《闽海系形成原因探析与地域文化》等学术论文 50 余篇，出版专著《闽海民系民居建筑与文化研究》（2003 年）、《闽台民居建筑的渊源与形态》（2003 年）、《中国廊桥》（2005 年）、《中国传统建筑装饰构成》（2008 年）、《中国民族建筑概览-华东卷》（2008 年）、《佛塔之国--缅甸》（2009 年）、《福建民居》（2009 年）、《传统建筑装饰解读》（2010 年）、《福建土堡》（2012 年）、《福建古村落》

(2013年)10部。2011年起任国家重点图书《中国古建筑》丛书的主编，完成其中《福建古建筑》一书的编写，预计2014年底出版。

主要社会兼职有：中国民族建筑研究会民居建筑专业委员会副主任委员；中国建筑学会建筑史学分会民居专业学术委员会委员；中国文物学会传统建筑园林研究会传统民居学术委员会委员；中国建筑学会生土建筑分会副会长；中国廊桥学会副会长；福建省土木建筑学会常务理事；福建省土木建筑学会建筑师学会副会长；福建省人大民族民间传统文化保护立法工作专家组成员；福建省文化厅文物保护专家组成员；福州市文化局文物保护专家委员会委员；厦门市文化局文物保护专家委员会委员等。



陳偉泰博士工程師是香港工程師學會消防分部委員會秘書。陳博士曾任於香港特區政府屋宇署文物小組高級結構工程師，在處理文物建築活化再利用所產生的結構和耐火結構事項，制訂指引。他擅長於焊接，玻璃幕牆工程，冷彎結構鋼工程，文物建築使用木材等。