

## Review Study - UNNC

### Traditional Tulou Housing and New Housing, Fujian Province, SE-China

Ali Cheshmehzangi and Liska H. Galvez

The University of Nottingham Ningbo China



Source: Ali Cheshmehzangi, November 2014

#### Introduction

Tulou buildings are one type of traditional rural buildings in South-Eastern China with rammed earth construction and wooden/timber framework. The use of rammed earth construction is common for most of the traditional housing (particularly rural) in the area. Some newer versions of Tulou housing are developed based on the previous plan and structural layouts. Some previous studies have looked into comparison of indoor environmental quality (IEQ) of these traditional rural buildings (Li et al, 2013) and household energy consumption analysis of the housing (Li et al, 2012). Less has been done as research papers in English for the study of housing characteristics and design specifications, particularly for the purpose of cooling and passive design strategies.

#### Objectives

- Analysis, mainly including desk work and on-site observation and measurements, of the traditional and new types of housing in the region, including traditional Tulou housing and new modernised design of such housing in some regions;
- Thorough understanding of rammed earth construction as the main material use in the region.

#### Methodology

The works was conducted with a group of students to assess the indoor living qualities (including air temperature, humidity, energy use and design specifications). As part of this workshop, informal discussions were taken place with the local residents of traditional Tulou housing. Discussions included the residents' overall impression and satisfaction, their energy use (mainly for cooling) and the indoor spatial use and arrangements.

## Conditions

Ranging from 3 to 5 storeys (typically), some of the larger Tulou houses are now partly used for commercial and tourism purposes. Some of the smaller Tulou houses are still mainly for residential purposes but are generally in deprived conditions. Minimal refurbishment has been done and some new additions are put in place, such as laundry rooms, extension for storage, indoor toilets and kitchen.



(left image) Mixed commercial and residential Tulou building.

(right image) Residential Tulou building with some additions, such as central laundry spaces (shown as concrete rooms at the side of the courtyard), indoor toilets and indoor kitchens.

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## New Types or Alternatives for Tulou Housing

Some attempts have been made to change the layout, material use and spatial arrangements for the new models of Tulou-like housing. The public satisfaction of such housing is higher due to new or modern material use, better indoor thermal comfort, and better spatial arrangements. Majority of the traditional Tulou houses use their upper floors for storage or for hanging clothes mainly. This is due to the difficulties in accessibility and lack of spatial use in upper floors due to mass migration of rural residents to urban areas.



(left image) New Tulou-like housing with new material use and more windows and opening; the main similarity is the semi-circular shape of the building and some construction details.

(right image) New construction of rural housing with local brick.

Source: Ali Cheshmehzangi, November 2014

## References:

- Li, Q., Sun, X., Chen, C. and Yang, X. (2012) Characterizing the household energy consumption in heritage Nanjing Tulou buildings, China: A comparative field survey study, *Energy and Buildings*, Vol. 49, pp. 317–326.
- Li, Q., You, R., Chen, C. and Yang, X. (2013) A field investigation and comparative study of indoor environmental quality in heritage Chinese rural buildings with thick rammed earth wall, *Energy and Buildings*, 62, pp. 286-293.