

# Design Exploration on Mixed-Use Development of Island House: Take the Southeast Coastal Area of Chinese as an Example

Fu Jiayan, Wang Zhu, Sun Jiaojiao

**Abstract**—Mixed-use development is one of the most important trends in new island house transformation along southeast coastal area in China. Unique island geographical environment and profound fishing village culture coexist for a long time in this. With artistic creation for the purpose of the "live-work" houses are in a large number of emergence, however, still lack of systematic strategy. Based on space effect from marine resources to regional human settlements, this article teases out the evolution regularity of island settlement context and architectural form, then, puts forward the formation mechanism and construction model of art island houses. Thereby, to further explore space design method and site creation strategy of mixed-use development.

**Keywords**—Mixed-use, Island House, Art Creation, Southeast Coastal Area of Chinese.

## I. INTRODUCTION

IN settlement organization and architecture construction, island villages, which is based on sea background as its basic industry, is significantly different from land villages [1]. In a large part, due to the limitation of border between sea and land, industries, culture, human settlements are relatively more intensive and mixed under sea background. With the regional promotion of Chinese new rural village strategies, island villages transform gradually from spontaneous form of diverse space spread consumption to settlement pattern of function and space integration. As an important factor of 'fishing island to not fishing island', sea characteristic industries, like art creation, culture management or tourist leisure in unit of fishing house or fishing village, has a profound impact on spatial evolution of fishing villages. In art island villages along Southeast Coastal Area of Chinese, number of every village build or rebuilt art island houses is up to 100 sets ever year. What's more, sum has reached to 2000 sets. Mixed-use development of 'art + life' has outstanding characteristics. Moreover, these characteristic settlements show features of distinctive art style, stable artwork yield and concentrated artistic personnel on industries.

## II. CONSTRUCTION TREND AND ART FUSION OF SEA SETTLEMENT

In spontaneous sea settlement construction, fisherman

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express sea worship and folk preference to ocean through architectural decoration. Fishing paintings, which have advantages of strong local characteristics and exaggerated style form, become main artistic carrier to show island house forms. From visual arts angle, these typical works depict simple emotion of local fisherman and mail picture of work and life. What's more, they record evolution procedure between sea art and settlement construction, which have great influence to each other.

### A. Construction Trend of Sea Settlement

Sea settlement construction emphasizes spirit characteristics of inclusive, contingent and practical. (1) Inclusive: a fisherman works and lives on the sea for even a whole year. They have wide mindedness of 'be tolerant to diversity'. When it comes to use organization of art fishing house, inclusiveness is concatenation of work and live, mix of creation and life [2]. (2) Contingent: fisherman usually explore in unpredictable sea. They create many kinds of fishing gears and fishing methods. When it comes to apartment layout of art fishing house, contingency is complex or flexible utilize of work space, for example, artist studio can also be lounge in different time. (3) Practical: fisherman have diligent and frugal internal conduct. They regard sea as field, fish as food. When it comes to choice of local materials, practicability is that rubble, black tile and wood become rural conditions to architectural construction of art fishing houses [3].

### B. Dialogue between Sea Art and Human Settlement

Creation subjects of sea paintings are fisherman in moratorium and their family members. Sea paintings is not only a part of life, but also a channel of making a living for art production. With the help from government, excellent sea paintings already have a considerable size. From angle of mutual influent way, sea art and architectural construction of house have both directions.

#### 1. Fishing House Bears Sea Art

Facilities, like water buckets, can be used as fixed anchors for canvas in wall. Inside, fishing house has independent and active area, for example, exhibition space for fishing paintings, manufacture space for artworks and rest space for artists.

#### 2. Sea Art Shows Fishing House

As previously described, fishing settlement is important object for creation of sea painting. Fisherman express construction and evolution procedure of sea human house

through methods of scenes reproduction, details exaggeration and images description.

Besides, art bases, carriers of reconstruction development for art villages, increases yearly. Only 2014, we reconstructed nearly 400 ancient island villages along southeast coastal area of Chinese. A large number of foreign artists, art students begin to create, paint from life or have an internship in island villages. In some samples of island villages, proportion of foreign art practitioners is up to 40%. Rapid increasing and artwork gathering of island art creation industry become main motivation to push work-live mixed reconstruction and region style development.

### III. CONCEPT IMPLANTATION AND CULTURE INTEGRATION OF MIXED-USE

In 2005, the first new island village established. Since then, implanting new industries into island villages becomes a characteristic phenomenon of sea island house transition. Meanwhile, new-built art villages from leading of 'up to down' government and re-constructed art settlements from spontaneous guiding of 'down to up' fisherman all appear exploration of mixed-use spatial design for island art houses [4]. Authors took part in several international competitions of architecture and planning design for island houses. Therefore, this article puts forward pattern concept and construction strategy of art island houses. Design of island houses are mainly around two cores: intensive land layout and mixed spatial use.

#### A. Intensive Land Layout

Take Zhoushan as an example. Zhoushan is located in intersection of East Golden Coastline of Chinese and Yangtze Golden Waterway, backed vast economic hinterland in Yangtze River Delta. However, hilly island pattern make constructed area only occupy 5.4% of whole land area. In addition, it is not regular at all. These reasons make innate limitation to location choice of island villages. From traditional construction of island settlement experience, although hysteresis of situation management and faintness of house property ownership need to be specified, yet work-live pattern is accepted by fisherman in a long term. In a large part, a multi-purpose house can integrate work and live area and highlight space value.

#### B. Mixed Spatial Use

In work-live relationship, art fishing houses are mostly 'work front + live behind' or 'work downstairs + live upstairs'. In order to make different function mixed but not disturbed, architectures often use loft style or mezzanine way to guarantee openness and privacy in the same time. Work-live mixed house have many kinds of flexible space. This space can be adjustable and derivative according to different terrain, geomorphology or work property. Meanwhile, it can be used as buffer zone and community separator of mixed-use space.

From modernization angle, substance of rising art fishing houses is procedure of mutual adjustment and house revision for regional sea art and modern art production. Architectural

creation of fishing houses should be based on regional culture. In the meanwhile, from actual utilization efficiency of work-live model, area of art fishing houses shall be controlled between 180m<sup>2</sup> to 280m<sup>2</sup>. Besides, in order to leave shared working corridor and painting wall, art fishing houses in Fig. 1 utilize unit combination of two or more houses to expand space carrier of art creation more effectively.

### IV. DESIGN PRACTICE AND SMART DEVELOPMENT OF FISHERMAN ART HOUSE

Under mixed-use principle, design practice of fishing art houses takes self-built fishing houses as object. Then, architectures implant art creation into residential country houses. Authors took a part into some architectural design competitions and made a combination of local living custom and characteristic behavior demand in Zhoushan. This article discusses construction method of island mixed-use houses through ways of house form transformation, creation place remodeling and so on.

#### A. Diverse Function Organization

##### 1) Horizontal Expansion Type

Take horizontal mixture as basic dimension. Inner courtyard and stairs are regarded as stationary factors of work-live interface. For example, 'Art Fishing House', a work of architecture design competition in Zhoushan by authors. Area of 'Art Fishing House' in Fig. 2 and Fig. 3 is 270m<sup>2</sup> approximately. Ratio of work area and live area is 1:1. Through method of split level and inner patio, authors arrange active area of artist and fisherman separately in the north and south sides of stairs. These parts of 'Art Fishing House' form semi-enclosed courtyard space naturally. It can stand on an advantage of ventilation and lighting. What's more, it can deduce mutual interference of work-live space [5].

##### 2) Vertical Intension Type

Take vertical mixture as basic dimension. Second floor and stairs are regarded as stationary factors of work-live interface. Through addition of outdoor stairs, it makes work space and live space both have individual entrances separately. For instance, first floor is mainly arranged for active area of artists which has a stronger public space; second floor is mainly arranged for living area of living room, dining room, kitchen and lavatory which has a stronger private space; third floor is only arranged for living area which has a strongest private space.

##### 3) Local Reformed Type

Take sharing mixture as basic dimension. Work-live interface is blurry. Most houses are re-constructed from 'old fishing houses' or 'art renting houses'. Using subject of work space or live space is syncretic. Generally, In order to satisfy work demand of temporary and scale, some parts of rooms will be re-constructed into art creating rooms. Ratio of work area and live area will be 1:8 because of small scale for public use when except from living activities of fisherman family.



Fig. 1 Picture of Unit Combination of Two or More Houses to Expand Space Carrier of Art Creation More Effectively. (Self-Painting by Authors)



Fig. 2 Picture of Work Space and Live Space are separated by Inner Courtyard and Stairs which are Work-Live Interface. (Self-Painting by Authors)



Fig. 3 Picture of 'Art Fishing House' with Fishing Painting on Its Wall from a Bird Eye View whose Work Space and Live Space are separated by Inner Courtyard and Stairs. (Self-Painting by Authors)

### B. Abundant Flexible Space Composition

#### 1) Static, Mixed and Diverse Apartment

Pipeline equipment is fixed, so that kitchen and lavatory are almost there. Other space is separated by light partition. Moreover, space can be re-combined flexibly according to diversification of industry pattern or family structure. For example, in the first floor of 'Art Fishing House', northwestern rooms can be arranged into elderly room, guest room and art

studio, etc. Changeable space which is closed to living room can be used as open dining room or multi-function room in order to extend living room space. It takes partitions to enclose and form private space which is regard as workshop, storage or guesting room.

#### 2) Dynamic, Mixed and Flexible Space

When it is in different time, function type of space is different. In order to satisfy characteristic behavior demands in different time, dynamic, it uses time difference to 'borrow' space. Thus, it reduces negativity of space to improve positivity of dynamic, mixed and flexible space. For example, mezzanine space in second floor of 'Fishing Art House' uses 'Closet Bed' to improve use efficiency of space. When it is in the day, bed will be turned up and hid in the closet to be a working space for artists. When it is in the night, bed will be turned down to be a living space for artists. Living assistant space of dining room, kitchen and washing room in ground floor will be used as shared and mixed space in the day and private living area for fisherman in the night.

### C. Scene Creation for Work-Live Combination

#### 1) Shared Scene in Neighborhood

Houses which in neighborhood in villages use different method in layout and model. There are three types of house forms, 'I', 'II' and 'III'. It turns into 'C' or 'L' type if it takes pairwise combination from above three types. 'C' or 'L' type transforms into shared courtyard in different enclosure sense to arrange open air exhibition or small architecture. In model, for instance, they, like cornice in south side, fence in first floor, wall in façade and public wall in neighborhood, are all creation carrier for fishing paintings. In order to manufacture abundant art creating scene in the outside, architects combine a variety of themes for fishing paintings with real scene of works for artists.

#### 2) Open Space for Fishing Villages

When it is in the way of forming systematic art industry villages, gradual conformation of fishing painting creation system makes re-construction of island fishing villages. For example, art community of fishing painting creation, art central of fishing art weave and internship base of art colleges, etc. Architects use main art axis, minor business axis and minor life axis to make village plan. In the meanwhile, those three axis can be used as linear open space for artists, tourists and fisherman respectively.

## V. CONSTRUCTION AND PATTERN OF ISLAND HOUSE FORM

With the development of mixed-use houses, house form design begins to transform traditional courtyard type or single-family type into modern embed type or unit type. Mixed-use space are more independent, intensive and flexible.

### A. Courtyard Type

Most courtyard type architectures which are still existing are ancient buildings which were constructed and preserved from Ming and Qing Dynasties. Because of its historic value and tourist value, ancient buildings separate from original resident

form to become carrier of business and travelling. Courtyard, as intermediary space, connects private space with public space. It can not only extend range of work-live space, but also avoid interference effectively from each other. Therefore, it continues mixed-use pattern from courtyard type.

#### *B. Single-Family Type*

On the range of urban and rural area, island people have their own homestead which is used to construct house. Therefore, under the influence of social development, location condition, mixed-use space pattern of single-family type comes into being. For instance, three basic patterns of 'work front, live behind', 'work downstairs, live upstairs', 'mixed-use work-live' and one another pattern of 'farmhouse'.

#### *C. Dock Type*

Generally speaking, business scale in first floor is bigger. As base of resident architecture, big scale is more likely to develop max business. It need basic structure bones throughout commercial buildings. However, it still have two problems.

##### 1) Traffic Problem

House entrance on the top of business building improve evacuation difficulty. It has hidden danger.

##### 2) Safe Problem

Big discharge of goods and beings will produce significant interference to resident area.

#### *D. Embed Type*

When it comes to determinant resident houses in southern and northern, in order to use street business value, architects will arrange a line of business buildings with one or two layers. What's more, these business buildings will form occlusion or neighbor relationship with some parts of resident buildings. Mixed-use pattern of embed type have two forms.

##### 1) Cross Type

This type can reach land conservation goal. Cross part structure can be treated in two ways. One is submitted to space structure of resident buildings as business assistance; the other is submitted to space structure of business buildings to be a big business space.

##### 2) Neighbor Type

This type is suitable for large business space because of structure separation of work-live space.

#### *E. Unit Type*

Unit type is a new mixed-use space pattern which is based on the urban development. Some companies in small scale or some freelancers arrange their working part and living part together in the same apartment. Some companies in larger scale will rent another apartment in the neighborhood as living part. For example, Small Office and Home Office (SOHO) in Beijing which is risen in recent years, etc. Advantages of SOHO is that it can reduce personal or company expenditure greatly.

Therefore, it can improve diversity of city population and industry structure. Disadvantages of Small Office and Home

Office is easy to cause interference problem and safe matter because of working area is sojourning at urban living area.

They are totally different in space pattern of Courtyard Type, Single-Family Type, Dock Type, Embed Type or Unit Type. Some are applicable in urban area, but some are applicable in rural area. They all can increase administrative space level.

## VI. CONCLUSION

Work-live pattern is valid measure of land use intensively, island culture resource development diversely and insufficient land condition remedy. Residence of artist, rise of fishing painting production and construction of new sea human houses are not only to adjust production structure of island art villages, but also to change regional scene features. Authors elaborate internal fusion reason of island art production type with combination of inherited feature from fishing paintings. Through analysis of work-live relationship and exploration of space reconstruction method, authors discuss its influence to art work-live pattern. This article gain a method to construct flexible mixed-use model which has sea characteristics. However, when it comes to practice specifically, to construct a strategy of mixed-use house form with sustainable development, it needs green building technology under mechanism promotion and standard conformity. Therefore, mixed-use is creation and vitality momentum, even space use tactics to maintain social operation in the way of resident evolution in island. Today, from courtyard economy, family workshop to complex plate, industrial community, island urbanization process is in a high-speed expansion period.

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