

Architectural Typology Dwelling House of Minahasan Ethnic in Talawaan Village, district of North Minahasa, Indonesia

Joseph Rengkung^{1),5)}, Antariksa²⁾, Suryono³⁾, Agung Murti Nugroho⁴⁾ and Jeffrey J. Kindangen⁵⁾

¹⁾ Graduate School of Civil Engineering in Architecture Field, Brawijaya University, Malang, Indonesia.

¹ORCID: 0000-0002-8258-565X

^{2),3),4)} Faculty of Engineering, Brawijaya University, Malang, Indonesia.

⁵⁾ Faculty of Engineering, Sam Ratulangi University, Manado, Indonesia.

Abstract

Objective: To study the typology of residential architecture of ethnic Minahasa relation with local knowledge. In order to know the distinctiveness of architectural typology was born from the culture and is the local wisdom of architecture in Talawaan Village. **Method:** Using is qualitative-descriptive method by doing field observation in order to get thematic as a unit of study and proactively conduct unstructured interview on resource related to research object. The study unit is taken in a purposive sample by looking at the variables. The results obtained were the residential home was built in 1873 in good physical condition until now. Then the analysis is done verbally in disclosing typology. **Findings:** The results of the study of typology found several concepts of the existing variables are, the concept of *sumpeleng* structure on the sloof block, the concept of *kalawit* structure on the floor beam and the concept of *tumongkor* structure on the roof. Clearly the concepts and variable is influenced by local culture and is a local knowledge, obtained empirically inherited in the embodiment of the typology in housing architecture of Minahasa ethnic community in Talawaan Village. These findings can enrich the science of architecture in understanding the typology of architectural works with a cultural background. **Application:** Feedback for government in making the local regulation that the value of local cultural values in producing architectural work of a dwelling house, is a local wisdom in the field of architecture that needs to be considered and preserved

Keywords: Architectural, Typology dwelling house, Minahasan ethnic, Local wisdom, North Minahasa Indonesia

INTRODUCTION

Previously, the Minahasa peoples used their own knowledge in construct a house from beginning to the end just apply an unwritten rule. This method, which well known as local knowledge as part of local wisdom in architecture, are found in North Minahasa district. This study is conducted to learn about architectural typology in housing, and research site located in Talawaan Village of North Minahasa, Indonesia as research location (Figure 1).

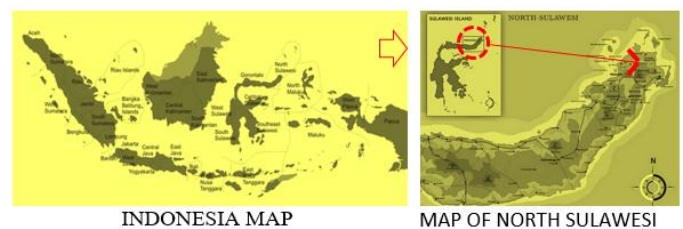


Figure 1. Location research

Talawaan Village was selected as research site not only because of the existence of old houses, but also because of its geographical situation. It is located near Kema Village, well known as one of the origin of the ancient Minahasan before spreading out in Northern Sulawesi Peninsula, [1]

According to first observation on research area, revealed that the house which was constructed based on Minahasan architectural typology had build in 1873. Even though got some modification, the house still well preserve until 2001 by keeps its original characteristic. The typology study could be obtained by observation of the house condition. [2],[3] says that based on visual appearance of form the object could be classified, clustered, and grouped according to the similarity in their specific formal structure. [4] says typology in architecture, the word has been referred to a particular set of characteristics of a building, and it helps identifying and categorizing buildings in different groups of forms. Data collection was focused on Talawaan Village as study area and architecture typology in dwelling house of Minahasa peoples as research focus. Study boundary was set just for existing neighborhood condition of Talawaan Village and the social culture of villagers related to housing architecture. Furthermore, the limitation study for architectural typology in dwelling house was set based on purposive sample of Minahasan household population on research area.

METHODOLOGY

Method was applied in this study is descriptively qualitative, [5] by conducting some site observations to obtain the thematic understanding as an investigation method and also conducting

some non-structural interviews, proactively, to some stakeholders related to research topic. [6] says Qualitative research method has been selected since it is a method enabling understanding of the context and the data collection tools provide flexibility to the research. The use of a qualitative survey is the innovative aspect and the originality of our work. The aims are to learn about the existing of Talawaan Village and architectural typology of dwelling house as the study theme. Data collection process (unit analysis) of the study was focused to theme of Talawaan Village as research area and theme of architectural typology of dwelling house in Minahasa ethnic as investigation unit. Theme of Talawaan Village have boundary just to village condition and social culture of villagers related to dwelling house architecture. While in the theme of architectural typology of dwelling house, the limitation was set by purposive sample to existing population and the house which was build in 1873 set as analysis unit. In qualitative research the commonly used samples collecting technique is purposive sample [5],[7] who said qualitative research do not use random sample but purposive sample. Hereinafter, in data analysis the first step is to reviewing all obtained data and then data subtraction by abstraction and make effort to compile the summary. The next step is composing in units and data validation process. This particular process became parameter in this research and intensive analysis was conducting since data collection phase, because if researchers had leave research area, its need extra efforts to remembering action had been done.

RESULT AND DISCUSSION

1. Talawaan Village's theme

Empirical theme of Talawaan Village has direct correlation with research area, so that it's important to be study. According to the book *Minahasa Utara Dalam Angka* [8] the Village located at 1.33°77" North and 124.57°45" East and average elevation is from 200 meter until 450 meter above sea level. Average temperature is 20⁰ to 37⁰ Celsius and the Village covers about 18.58 square kilometers. Talawaan Village is the oldest village in sub district of Talawaan in North Minahasa district and, geographically, located near 'Kema Village, which known as one of place where the ancestor of Toar and Lumimuut first landed in Minahasa from Kingdom of Ureisina in Mongolia' [1]. In consequence, this village is full with cultural ceremony in their social activity. Notable point in this traditional dwelling house building is the process of construction that called *mapalus*, it is a mutual cooperation between villagers, as legacy from the ancestors of Minahasan, to deal with daily problem together by rotation to each household [9]. Furthermore, there is a ritual to build a house, an unwritten requirements has to follow. In social daily life, Christian religious ritual (catholic and protestant) also involves such as weekly families worship, men service, women service, Sunday school, and thanksgiving service. The activities were indicated had influenced to the architectural typology of

traditional dwelling house in Talawaan Village. The Culture of the community is a local wisdom that needs to be preserved in existence, however, even though had some compromises in native culture as consequence of the missionaries activity, but the essential typology still remains in villager daily life until today. [10], [11] says local wisdom is always changing, because it follows the culture dynamics and it cannot be separated from the human mindset. The most important thing is to selectively accept outside influences so that local knowledge can be maintained in accordance with the place

2. Architecture typology's theme

Empirical theme of architecture is the main focus in this study, so this variable was observed as a crucial point and need to get special attention not only in site observation, analyzing, interpretation, but also has to objectively conclude. Moreover, in some study, the terms of typology was known in several definitions, but in architecture it was indicated as learning about a type. Therefore, in architectural concept, 'type' is something had related to build-architecture. According to Moneo 1978 [12] a type can be defined as a concept which describes a group of objects characterized by some formal structure. It is fundamentally based on the possibility of grouping objects by certain inherent structural similarities. Typology that indicated as 'type', was often defined as 'set of types'. As noted earlier in typology's paradigm, [13] Theory of typology could aid our understanding of architecture within its historical and socio-cultural context. Concepts of type and typology, which is so rich in tradition and so important in intellectual history, for architectural discourse. The shortcoming of conventional typologies is that types are not described independently but are interpreted from paradigm instances which is a serious threat to their reliability [14]. Paradigm that revealed was known and indicate as parameter of architectural typology. However, in this study, research was limited just toward analyzing unit of dwelling house that constructed from 1873.

Minahasan Dwelling house's architecture since 1873

A dwelling house that constructed in 1873, owns by Kambey family, was taken as analyzing unit for typology research. Object was chosen base on its existing appearance that representing the common dwelling house in the area. Typology analysis was acquiring base on characteristic of dwelling house type which was stilted, divided on two parts; typology of pit (sub-structure) and typology of stage (upper-structure). Both of the typology have different limited variable i.e.: (a) research variables for typology of pit: floor plan type, foundation structure, wooden footings beam, and column, (b) research variables for typology of stage: floor plan type, column, floor, wall, and roof. Unit of typology analysis is shown in figure 2.

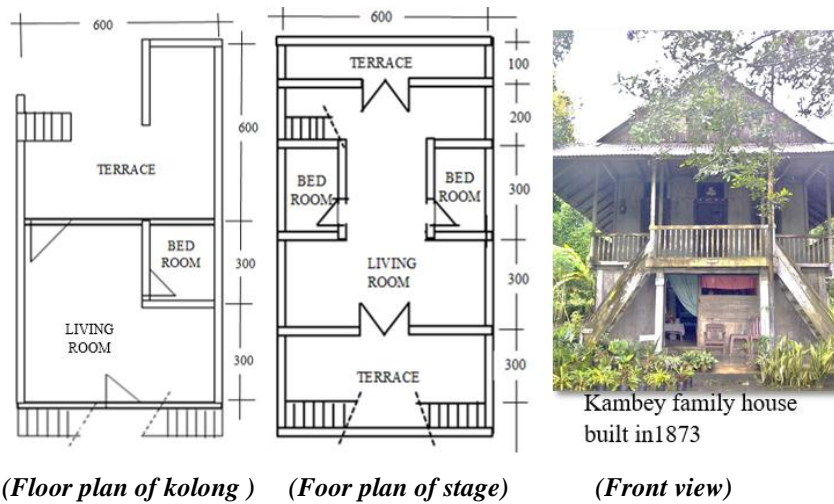


Figure 2. Analysis unit of Kambey family house

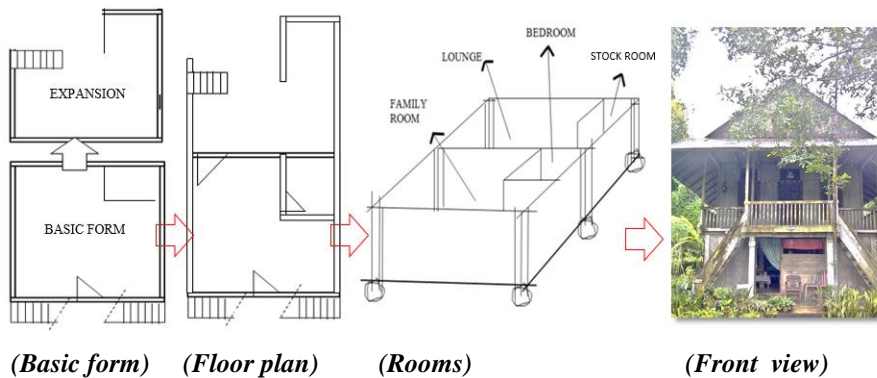


Figure 3. Typology of kolong

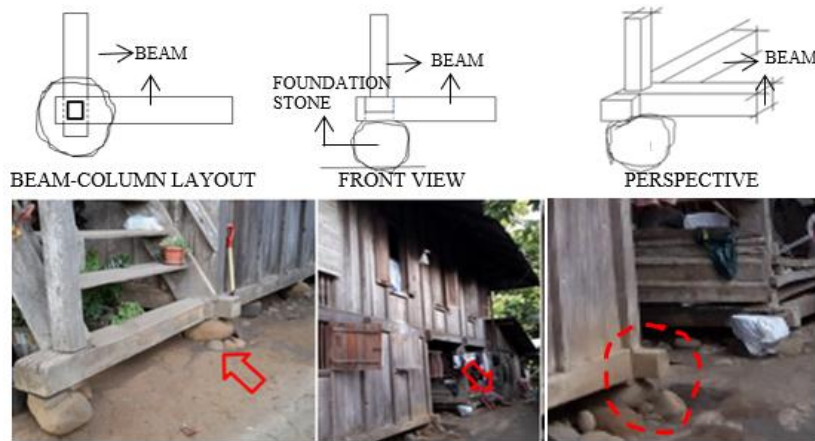
a. Typology of kolong

Data gathered from analysis unit revealed that typology character of *kolong* consist of some variables as shown before. *Kolong* is empty space under the house. Some house Minahasa ethnic are used for public area, the place animal, yields and stock room [15]. From result, it was know that the construction of this house, in the beginning just the front part (one room) in square shape and in the rear part was constructed two column to support the stage. Furthermore, additional room had been developed in the rear part of house, with no wall been added to the new room it intend to became common room, so all family member can do their activity in this room. However, even the room was functionalized as common room, bathroom and toilet could not have direct access to this area, they were positioned in back area of main house, and it was restricted by unwritten requirement. The typology of *kolong* and function of this analysis unit is shown in figure 3.

Typology kolong of floor plan revealed the simple layout of front room, rectangular as basic shape, and then evolved to back area by following the installed columns. It means they are not establishing new form, but the rectangular shape had generated basic type that attach to architectural entity. Concept of front room is enclose by wall but had doors and windows.

Whereas at the back area are left open and can be access from all directions, it is intended to create room which surrounding by outdoor area. This concept of open-room is not only to create space for family activity but also to symbolize that the owner would be happy and welcome if someone will visit and be a quest. "This has become character of Minahasa people, they will be happy if someone came to visit"[16]. Meanwhile, movement circulation from downstairs to the stage is positioned at front and back area of the house.

Study of the building structure revealed a presence of empirical calculation about the structure's strength. It can be observed from the application wood material (whole wood) which utilized as footing beam and column to support stage typology. Utilization of whole wood without artificial connection has a purpose to avoid weakness in structure. Moreover, informed by owner, all wood using to build this house were just from one tree. It means they were considering about the dimension of the tree before cut it the house. Then, if we observe about layout of house foundation's structure, it just laid on stone which is not planted in the ground but just laid freely above the soil (figure no. 4).



(Beam just free-laid on footing/foundation)

Figure 4. Type of foundation's structure

The columns that connected each other and utilized as footing beam are named *sumpeleng* structure. In practice, layout of these columns had concept has to follow i.e. stem- beam should not horizontally connected with the end of beam and in square shape, this rule is intended to create balance. In the process of construction, they have to start from right side and continue in counter-clockwise direction until form a full square, like in figure 5.

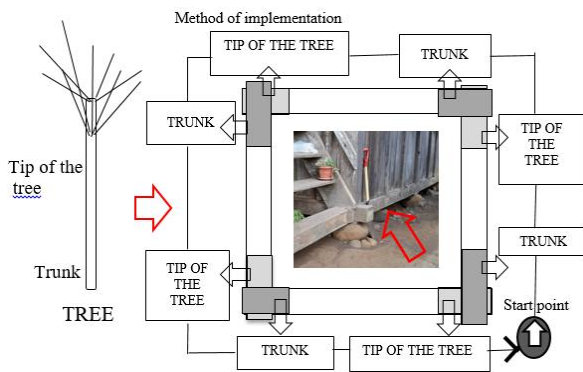


Figure 5. Philosophical process in construction of footing beam

The installation of wooden material in forming of rooms i.e. wall, column, doors, and windows, are following concept

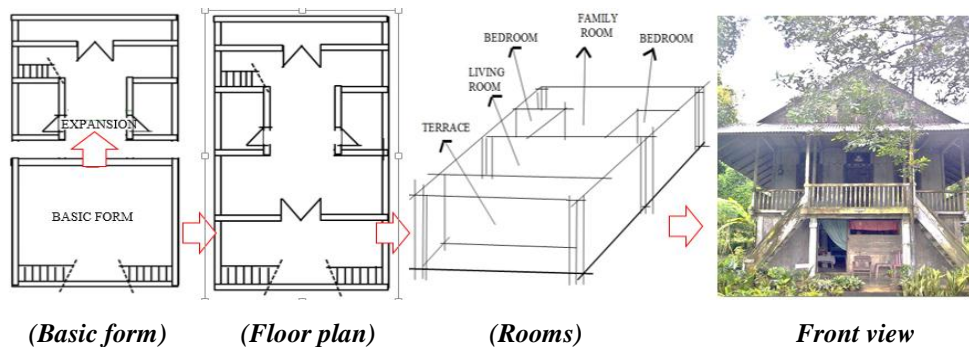


Figure 6. The stage typology

philosophy of tree. All material is assembled by following the tree's growth; stem always in the bottom and should not in the opposite. Process of construction is named *mapalus* and lead by a person who already has experience in this job.

b. Typology of Stage

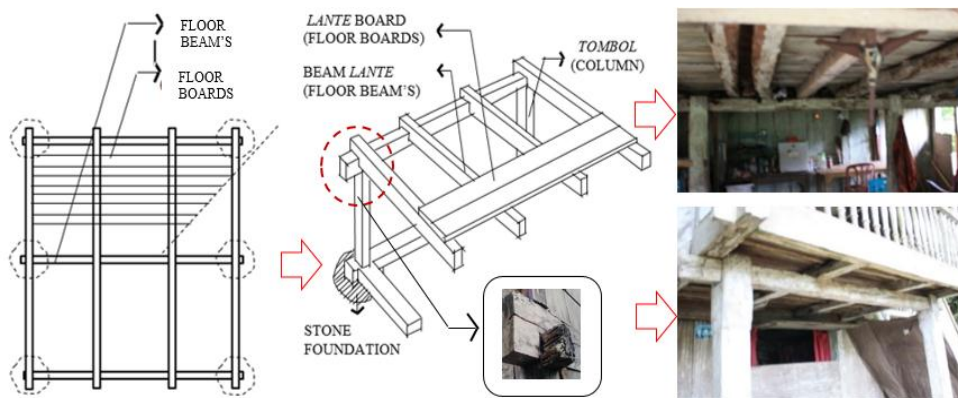
Research of stage's typology like in variable has shown before and it revealed that for floor plan are following the form of pit's floor plan, in rectangle form, and extended to back side. Subsequently, room's layout at back side are applying symmetrical concept. Room's composition in the house was arranged opposite each other with an alley in the center as a main movement circulation from front area to the back. In front area can be found two rooms; living room and terrace. The terrace just lined with kind a fence, named *regel*, while living room is covered by wooden partition and equipped with door and window. Interview had revealed that the owner desire to this kind of room arrangement to accommodate religious activity such as family worship and other activity which involve large number of participant. The stage typology is shows in figure 6.

Research about typology of stage stated that the module of house's structure is in rectangle shape and elongated in front to back direction. The floor beam's structure which is utilizing wooden material as buffer has important role in order to support the weight of floor, columns, partition, and roof. The rectangle structure and then strengthened by positioning of columns right in the center is utilized as foothold of wooden floor. Work methods of this structure type are indicating that the builder has calculated the strength of structure even though just by empirical factor. Configuration of grid structure combined with overlapped beam and in connection part they made a notch which was hook up with a dry bamboo peg. At the final process, when wooden floor was installed, the floor construction became flexible, means not rigid. It can be so elastic and comply with movement of shear. This kind of floor beam is called *kalawit* structure, it is shown in figure 7.

In the stage typology there is another wooden structure called *ari'i* (column) which is support the roof structure. The column was placed at corner of rectangle and then at the points where doors and window located. Its dimensions are follows the

dimension of door and window. These columns not only planted at floor beam but also tied with upper beam which encircle the room. This kind of structure have purpose to strengthen the columns which is now attached in two parts. Columns that installed at side of doors and windows are utilized as hanging column. In addition, the columns have strengthened the whole house structure because lengths between columns are following the length of windows and doors (usually not more than 1 meter). It can be seen in figure no 8.

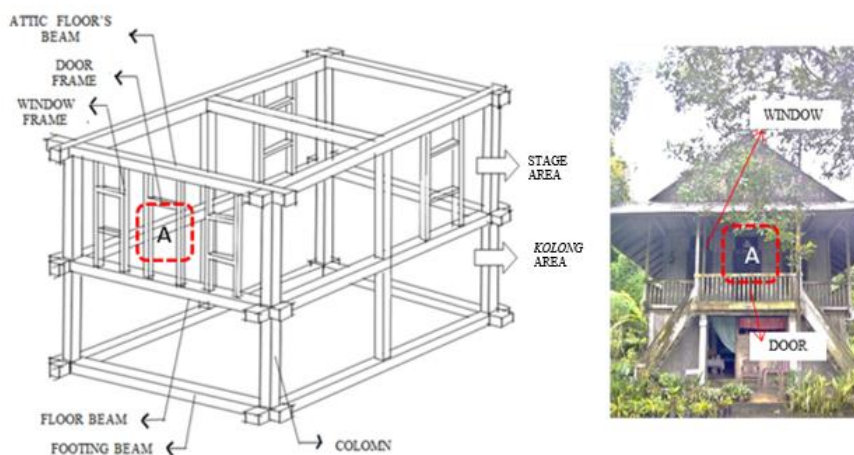
Principle of column's layout also following tree structure, means should comply with tree's growth direction not in opposite. In the past time this principle was not have any problem because all beam and board, which was harvest from surrounding forest, always marked to differentiated each part of wood. Wall structure also utilizing wood material (board) which is installed vertically with the same concept and at partition connection they notch both side of board (1cm) before sealed together.



(Floor's structure)

(Perspective of floor's structure)

Figure 7. *Kalawit* structure and wooden floor



(Column's Structure)

(Position of Door and window)

Figure 8. *Ari'i* (column) structure

Information had obtained that the vertical concept of house is based on human anatomy concept i.e. head, body, and feet. Waterson 1990 [17] said that 'most of faith system which is origin in Indonesian Island based on three layer of cosmic in one world. Human being occupy middle world, between upper world and under world. Under world is the dirtiest place, while upper world (*loteng*) where wealth legacy saved is the most sacred place'. In application, function of analysis unit shows that part of 'body' is the central of family activity named *awu*, and for 'feet' area utilized as common activity room named *kalawat*. Meanwhile, the 'head' part of house is utilized as harvest storage area as sacred place named *soldor*. Aside from above concepts, there is balance concept, because most of shape of these traditional houses appears in symmetrical form. At research object, the balance concept can be observed at house's façade and in distribution of rooms (figure 8). This symmetrical form became nature of Minahasan traditional dwelling house in Talawaan Village and this form is more common because this architectural typology had exist since ancient time. [18] said; 'Minahasan traditional dwelling house had symmetric form, construction and elements at left-side and right-side is similar'.

Roof construction in research object shows that roof structure is not apply trestle column (*tiang raja*), called *tumongkor* structure and forming a room without column which utilized as harvest storage area. Structure of attic floor was constructed by considering its function as *lumbun* (storage). *Loteng* can be access by a ladder located at main sleeping room. It means to access this area need special clearances from head of family because this is a sacred place of family, even they are belief that attic is a hieratic place. [17] said; 'attic is considered as location of the ancestors and at the rooftop beam which is sticking out (*mafana*) of a leader's house have to hanging some sacred objects'. At the front side of attic placed an air ventilation to maintain air circulation. This ventilation is formed like a small window that can be open to control the air requirement. Attic concept is shown in figure 9.

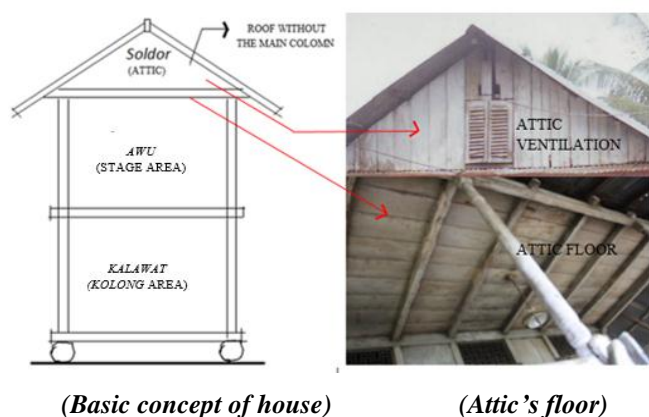


Figure 9: Attic shape

CONCLUSION

Study revealed that a community culture in the shape of dwelling house architecture like *mapalus* method, the process's philosophy from the beginning until finished, and also weekly

religious ritual from Christian faith, Catholic and Protestant, has influenced the architectural typology of Minahasan dwelling house. Even though have some impact of culture that makes some variation in application, but the essence of original typology is remains until today. Meanwhile, the structural concept of *sumpeleng*, *kalawit*, and *tumongkor*, became local wisdom and legacy to empirical inherited to create architectural works especially in Minahasan dwelling house design. The local wisdom in architecture in Talawaan village, North Minahasa, Indonesia, need to be preserve and introduced to public.

REFERENCES

- [1] Gosal P.A. and Gosal C.H., 2008 *Tou Minahasa, Dari Utara Sampai Malesung*, Percetakan Offset, Manado.
- [2] Antariksa., 2010 *Tipologi Wajah Bangunan dan Riasan dalam Arsitektur Kolonial Belanda*, <http://antariksaarticle.blogspot.com/2010/05/tipologi-wajahbangunan-dan-riasan.html>. (accessed March 25, 2015)
- [3] Amiuza C., 2006 *Tipologi Rumah Tinggal Administratur P.G. Kebon Agung di Kabupaten Malang* Jurnal Ruas. IV (1); 1-22. (accessed 11. 25. 2005)
- [4] Kim. S.A., 2014 *Typology and Design* www.tboake.com/competitions/2014 Andrea KimEssay.pdf (accessed 25 februari 2016)
- [5] Sugiyono., 2012 *Metode Penelitian Kombinasi*, Penerbit CV Alfabeta, Bandung
- [6] Nilüfer Ak nc türk., et al 2010 *Qualitativ Research Approach to the Innovativeness of Architecture Firms* [https://www.idosi.org/wasj/wasj8\(8\)10/10.pdf](https://www.idosi.org/wasj/wasj8(8)10/10.pdf) (accessed May 26, 2016)
- [7] Moleong L.J., 2004 *Metodologi Penelitian Kualitatif*, Edisi baru, Penerbit PT. Remaja Rosda Karya Bandung.
- [8] Lengkong et.al., 2016 *Kecamatan Talawaan Dalam Angka (2016)*, Penerbit Pusat Badan Statistik (BPS) Kabupaten Minahasa Utara.
- [9] Turang T.I. et al., 2012 *Kajian peran mapalus dalam pemberdayaan masyarakat di Kota Tomohon*. Kajian peran mapalus dalam pemberdayaan masyarakat-Portal Garuda download.portalgaruda.org/article.php?.....Kajian%20Peran%20Map. Vol.15. (4), pages: 1- 4 (accessed 5.28. 2016)
- [10] Dahliani et al., 2015 *Local wisdom in built environment in globalization era* International Journal of Education and Research Vol. 3 No. 6 June 2015 www.ijern.com/journal/2015/June-2015/13.pdf (Accessed July 12, 2017)
- [11] Antariksa., 2009 *Kearifan Lokal dalam Arsitektur Perkotaan dan Lingkungan Binaan*. antariksaarticle.blogspot.com/2009/08/kearifan-

lokal-dalam-arsitektur.html (Accessed February 26, 2015)

- [12] Stouffs R., 2015 Typological Descriptions as Generative Guides for Historical Architecture <https://link.springer.com/article/10.1007/s00004-015-0260-x> Vol. 17 (3) : page 785–787 (Accessed, 4.7. 2017)
- [13] Guney Y., 2007 Type and typology in architecture discourse |Guney| Balikesir.. fbed.. balikesir. edu.tr/ index. php/dergi/article/view /186, page: 4 (Accessed 4. 6. 2017)
- [14] Leusen M.V., 2016 A Typology of Dwelling Arrangements - Jul 22, 2016 - SAGE Journals. journals.sagepub.com/doi/abs/10.1068/b230143 (accessed May 12, 2017)
- [15] Tumenggung et al., 1991 *Arsitektur tradisional daerah Sulawesi Utara* author Syamsidar Publ. Dep. Pendidikan dan Kebudayaan, Direktorat jenderal kebudayaan Direktorat Sejarah dan Nilai Tradisional, Proyek Inventarisasi dan Pembinaan Nilai-Nilai Budaya, 1991, Jakarta, pages: 193-199
- [16] Graafland N., 1991 *Minahasa, Negeri, Rakyat dan Budayanya*, Translated by Montolalu R. Penerbit Pustaka Utama Grafiti, Jakarta
- [17] Renwarin P.R., 2007, *Matuari wo Tonaas. Dinamika Budaya Tombulu di Minahasa Jilid I, Mawanua*, Penerbit Cahaya Pineleng, Jakarta.
- [18] Harimu D.A.J., 2013 *Minahasa Arsitektur Rumah Tradisional Dalam Akselerasi Perubahan 1900-2000*, First Edition, Penerbit Lintang Rasi Aksara Books, Yogyakarta.