The Structure System of Bugis Traditional House in Disasters Perspective

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Abstract. The existence of traditional house until now could be believed as proof of a good human protector. Bugis traditional house is one of them. The research problem is how Bugis behavior and building structure performance to struggle in flood. The goal is to reveal the performance of house structure and Bugis ancestor behavior to survive after disasters. The methods are logical argumentation to explain the architectural knowledge, and modeling simulation to explain building structural performance. The results are Bugis ancestor has been leave inheritance a good behavior in survive after disasters through they architectural space arrangement. They prepare space in a safe area at their house for food storage, so when disasters happen they still have food stock without waiting for aids. The structure system as the stilt house its find in safe for the occupant because of space for human living lifted more than two meters above the ground surface. The structural performance indicates the displacement in early dangerous occur when flood loads higher than human living space. The best knowledge can be adopted in this research is the availability of food stock at own house. The better construction method to apply in flood area is the stilt house.

1. Introduction
Disaster always followed by damage and victims. There are related to human and build environment. Building as the main places for human activities is the properties which expected as they protector. Therefore, human safety should be a guarantee when its harms happen in its.

Disaster is still a mystery in human life, coming uninvited and leaving uncommand. It’s come in embody of earthquake, landslide, tornado, tsunami, tidal wave, flood, etc. They go anywhere by leave damages, sadness, harms, victims, and the death.

The great world threat disaster has found. This threat is noted at a map disaster and has been established called the ring of fire. The republic of Indonesia in the geographic location includes in these maps. The country which is listed in these maps has a serious threat of disasters, especially earthquake. Disasters like an earthquake, tsunami, tornado, flood, tide wave, etc., is the part of the life cycle of the world. It’s an unsolved mystery even from sophisticated technology. The world is running across time parallel with disasters event. The latest even the largest impact of disasters. The earlier existence of the world seems to be the earliest disasters occur so that disasters are natural. The world and disasters are twin brothers. This event sometimes aggravated by human being lost control to manage development. The absences of human awareness in the activity can cause disasters which bring sadness and misery to them self. Its follows by disadvantages like properties damage, injures and some lost life. Disasters occur by two major ways, natural and human errors.

Indonesian National Board for Disaster Management record 3741 disasters in 2018/2019. This disaster includes floods, lands slide, tornado, tide wave, burning forest, tsunami, eruption, and the...
earthquake. In this period, South Sulawesi Province record 147 disasters caused 10 dead, 87 injures, and 699 building damages.

Built a house or building generally have done a proper way in the planning and design process. The exact calculation should be done to get a good performance and stability from any load include load caused by natural disasters. The basic rule of building design and planning is a part of the Indonesian constitution no 28 in 2002. The main consideration in this regulation is the priority of human safety.

Bugis traditional house has been proved their existence in a long period, and serve their function in a cross-generation. This house recorded in history as a cultural invention and its noted in lontaraq (Bugis script). This traditional house has been existed since lontaraq time, estimated by an expert in the same age with Chines ceramics period in 7 centuries. This means that the house estimated has been serving as the living space since as long as 1200 years ago. In this long time aged could be determined that it has been expert experiencing in some disasters. The ability of the house to survive in a long timeline believed that it has a specific construction method. This specific construction method known as local wisdom and this way should be revealed to develop as the new approach for a better life in the modern era.

The ability of Bugis traditional house survive in long period can be stated in simple ways that this building type trustworthy in facing disasters. The ingenuity of traditional building to withstand in the disaster has beenproved by the expert. Traditional building in Kampung Panjalin West Java sowed they best ability to withstand from earthquake compared to the modern building. The construction method of this building has a similarity to Bugis traditional house as a stilt house.

South Sulawesi Province inhabit by people who used the stilt house as their daily life. In this prone, to disasters area, this house type spread until in remote region. This stilt house has been experiencing diversity disasters generally wind storm and flood. In this year, 2019 at the end of January the flood has been filled 6 districts. Flood disasters caused 9 people lost their life and 7 was unknown their existence. The same disasters come again at the end of June 2019. The east coastal region Wajo, Sidrap, and Soppeng submerge by rainwater. The quality and quantity of disasters seem to be bigger than before. So that, the hard effort should be forced to eliminate the negative effect of this tragedy.

This research is very important for setting preparing to handle an unpredictable disaster. The results will reveal the Bugis local wisdom which has been proved them self to survived in disasters for a long time. Bugis traditional house is the real evidence as a good protector to their occupant. It is consisting of two main entity in embodied, structure and architecture. Structurally has been show the ability to bring optimal protection and architecturally has been set in good room coordination for survive. What the secret thing hiding in that two factors will be reveal in this research.

2. Methods

This research will reveal the Bugis traditional house in facing disasters. There are two goals will be discovered, namely architectural local wisdom and house structural performance. Both of goals are discussing in disasters perspective. This research goal will bring to us the lesson from the past about the strategy to survive in disasters.

Logical argumentation method will describe the Bugis traditional house in facing disasters. Room function and composition will be analysed in the role of room arrangement in disasters perspective. The explanation composes in the logic description.

Structure performance in defended disasters especially flood will be explained by modeling and simulation methods. This method will be supported by computer software SAP 2000 version 14. Displacement node in structure caused by the flood described in the graphic. The role of this method in solving research problems needs additional setting to mirroring the real structure of Bugis traditional house. This effort caused by some of the joint in structure is not available in software default. Therefore, modification should be done to create similarities between model and reality. Structure models show at Figure 1 point (a).

Bugis traditional house has a specific structure system. Generally, this structure made from wood composed in two structure categories, primary structure, and secondary structure. The primary structure
consists of beam and column to support all building as a frame. The primary structure covered by the secondary structure like floor, wall, and roof structure. Primary structure assembled similar to (H) shape in alphabet letter. Secondary structure installed to the primary structure by specific joints. The primary structure uses a fixed joint. Primary structure and secondary structure connect as pinned joints. Structure system of Bugis traditional house is displayed in detail in Figure 5.

Wood is the main materials for built Bugis traditional house. Therefore wood mechanic properties should be use for modeling and simulation. Wood classify as the orthotropic material class has specific mechanic properties. Wood species used for primary structure is kayu keruing (Dipterocarpus spp.) and wood species used for secondary structure is kayu kapur (Dryobalanops spp.). The first wood has 11.800 Mpa in elasticity modulus and the second wood has 11.000 Mpa in elasticity modulus. Both of modulus reached in green condition [1]. The quantity of load obtained from Indonesia regulation in load for building. There are 200 kg/m² for life load in housing function, wood weight is 1000 kg/m³ [2].

![Figure 1. Modeling result of structure system of Bugis traditional house](image)

The joint system which used in structure system of Bugis traditional house consists of 3 types: fixed joint, pinned joint, and freestanding joint. The fixed joint and the pinned joint are commonly known in modern mechanic science but the freestanding joint is rare. The last joint system has been used by Bugis ancient technician to build their house. The principle of a joint is delivered dead load only, moment and torsion are free effects to other bars. This joint principle applied at the bottom of the column and floor structure.

The column bottom sits on the wood pad or the stone pad. End of the column is not connected to earth directly. This end column allowed to move or shift position freely. Load distribution in this principle is delivered dead load only, moment and torsion not transferred in full ways.

The similarity of model and reality should be done and need to be modified is the floor structure. Representation of a model in the software setting has done by creating imitation connector between floor girder to the main beam. The connection this both of beam is free-standing joint or dead load joint.

The column of Bugis traditional structure can be divided into two-part, the upper part and bottom part. Bottom part column experienced load water pressure by the flood. The column in the general calculation principle is the specific task for bearing axial load only but not in this case. The column experience load pressure from the flood load. Load pressure replication for column needs modification. This modification setting by changed column to be a plane strain. This column set like a thin wall and force by 100 kN/m.
3. Results and Discussions

Research results and discussions describe in order of flood in general view. The explanation covered by architectural perspective, structural system perspective, and node displacement in structure caused by flood loads. The end of the discussion is closed by suggestion application for policy development in preventing harm in disasters. Complete discussion display below.

3.1. General View in Research Disaster

Research in disasters area is wide on the topic. Based on the trigger of disasters there are two main sources, disasters caused by the human errors by failed in control of their environment, and disasters caused by natural directly. The first disasters caused by a man easier solved than the second one. It is related to the victim's quantity and the spread impact area.

The research result becomes a new guide to the future generation in how to survive when facing disasters and How to prepare to survive after disasters. This effort will be explained by analyzed the building system structure performance when the flood hit the structure. The other way is exploring the Bugis ancestor traditional behavior to arrange the room function in their house.

Disaster events always bring a negative impact on people's lives. The effects of disasters will be felt individually and collectively by the community. Efforts to improve conditions and reduce negative effects provide considerable opportunities in the field of research. Research in terms of the disaster becomes an open-source, includes elements of management and technical elements. Many elements of management research have been carried out as in the following description, but the building structural behavior is less, especially exploration from the past in case of disasters.

Disaster management and efforts to improve community service affected by disasters have been carried out in Cuba [3]. Handling and disaster management are arranged in such a way about the duties and responsibilities of each interested party. The involvement of individuals, community groups, local, regional and state-level governments has a certain authority. These authorities include handling protection, emergency, rehabilitation, reconstruction, and long-term development. The environmental disaster recovery approach made in Cuba includes 5 main things, namely: development of the construction industry, housing development, systematic urban and regional planning, early warning and evacuation plans.

Disaster control management that generally occurs after a disaster event was developed. Research on the restoration of library services at Mzuzu University after experiencing fires in 2015. Data collected from 18 library officials and 64 students praised the recovery of post-disaster library services in terms of physical repair and the procurement of the latest library resources. The problems faced are limited reading space, limited internet access, and lack campus information services [4].

Construction activities towards community protection from disasters are interesting topics. This happens because the people in coastal areas will be faced with multiple problems [5]. Do you choose the beauty of the beach environment in this case environmental sustainability or priority safety? This difficult choice attracts attention to reveal a way out of 2 contradictory development choices. Facing the potential for disasters on the coast of Japan such as rising tides, tidal waves and tsunamis Japan has planned structures and coastal constructions such as breakwaters and retaining walls along the affected path. As a result of development activities such as this, there is often a conflict of interest between the community and coastal safety. The results of the study show that people who often visit the coast prefer ecosystem conservation compared to the construction of water retaining walls. People who have experienced disasters are more interested in the construction of water retaining construction. Finally, this research reveals that the community is more confident in the information about coastal management research findings. In this case, efforts to reduce the negative effects of water retaining construction on coastal ecosystems and consider other options such as disaster management based ecosystems.

Research on the effect of column end collisions on the floor surface on a flat plate structure. Structural damage at the top of the column surface which is connected directly to the floor plate can be avoided by several methods including [6]; a). plate thickness around the column needs to be carefully calculated. b) addition of reinforcement plates around the area around the column. c). additional elements in the form
of a frame structure to distribute wall loads. d). calculation of slab resistance needs to be done in such a way that the placement of reinforcement assistance is obtained optimally to reduce load carrying capacity, plate span, or the addition of plate thickness, e). load that occurs during implementation, especially horizontal load and centralized load when the implementation process that uses fast time must always be calculated, f). the time of opening the mold must be determined, g). the scaffolding that is right in the area of the top of the column must be following the shape of the column and plate planned, h). must use a flat scaffold and a temporary diagonal at the time of execution.

Disaster prevention and recovery that occurs in the implementation of construction development requires efforts to avoid casualties and material losses [7]. Special agencies or institutions to deal with disasters in the implementation of construction are needed to plan disaster prevention which includes estimates of risks and hazards that may occur, crisis management, including management of companies that coordinate with government agencies. Estimates of disasters that may occur in the implementation of construction must be prevented.

A new method for simultaneously evaluating the advantages of temporary housing configuration. This method consists of 4 design models for analysis and optimizing decisions on housing after a disaster. The models include socioeconomic, financing model, socioeconomic profit level, model optimization [8].

Disaster maps in Russia were developed for parties concerned to take appropriate decisions in disaster management and guidance efforts. Disaster management has been formulated statistically in terms of the magnitude of the disaster and consequently according to the risk element in an integrated manner [9].

Examine the community's temporary housing after experiencing a disaster. The location of the study was conducted in Chile and Peru [10]. This research provides an overview of the behavior of settler families in meeting their needs without the support of external elements. The results of the study indicate the importance of completing a temporary settlement design with instructions on how to safely change such temporary settlements. Likewise, instructions on the compatibility between their additional building structures are temporary and permanent structures.

The frequency of disasters tends to increase and seems to be a warning of increased vulnerability to danger. Disaster events are directly proportional to the increase in trauma for those who escaped the disaster [11]. The increase in people's inability to increase income after the earthquake occurred in Nepal after the earthquake. Continuity of the inability of the community needs to be resolved as a strategy to deal with natural disasters in the future. Post-disaster recovery is needed by medical staff and physical therapists.

Disaster management after the 2012 tornado disaster in southern Indiana. The selection of infrastructure after the occurrence of the disaster could only be implemented about 1 year after the event, namely in 2013. Factors that affected the rapid pace of post-disaster treatment were found in this study. The delay in handling disasters is caused by the quality of disaster, the greater the disaster, the slower the recovery. Delay in the information received by insurance companies, the number of recovery services. The speed of recovery services is determined by the government's concern in terms of the proximity of the government to affected communities, the strength of networks between communities, the presence of assistance from adjacent areas, the presence of previous experiences in the same disaster [12]. Disaster events that are related to various aspects have led to various types of research. The research is basically to find the best solution so that the negative consequences of disasters can be avoided or at least minimized.

Research develop in disasters is varied as described above. The scope includes management and optimal solution to minimize the negative effect of construction erection. That recent research differs to this one in case of the theme. This research present is accomplishment from the early research. The uniqueness of this research is the focus in learning from Buginese society in handle disaster. The research state of the art is the ingenuity of Bugis traditional house especially in the structural system and the architectural space coordination in disasters perspective. Learning from the past to develop a new better life is the specific discussion in this explanation.
3.2. General Disasters in South Sulawesi
South Sulawesi Province has got mercy by its location in relatively safe from great nature disasters threat. Generally, this region hit by flood and tornado just low in frequency and impact. This disaster occurs periodically in a year. It’s covered a wide area. Figure 2 below sawed the recent spreading flood in Sengkang City Wajo Regency. The other great natural disasters like earthquake, eruption, landslide, mostly rare occurred.

Although this region relatively safe from great disaster, the preparation and planning should be equipped by a good strategy to minimize victims. Rarely occur does not mean free from disasters, there is no area in this world free from disaster. Flood disaster caused by heavy rainfalls occur two times in a year. In December to January occur in at the west area of the peninsula and in Mei June occur at the east area of the peninsula.

![Figure 2. Sengkang city aerial view in custom (a) and flooding situation (b)](image)

The flood impact on the settlement caused the house inundated in the undefined certain time range. This condition forced a new adaptation for their society to continue their daily activity. Accessibility and distribution of their basic needs automatically disrupted.

![Figure 3. Bugis traditional house settlement at the river bank(a and b) and flooding (c and d)](image)

Figure 3 point (a and b) showed the Bugis settlement who lives in the river bank or waterfront, point (c and d) showed Bugis traditional house in flood situation. That houses in rainy seasons will be covered by the water as shown in the figures. The Bugis people in this situation still feel safe and doing their daily activity in the normal way. They can protect their properties and prepared their food without hesitant. This condition at a glance view, look like in a dangerous situation but not by Bugis society. Environment covered by water can be predicted in simple ways if the landed house built in it. It is
ensured will bring a great disaster. Bugis ancestor has brought us the wise lesson to live harmony even in a dangerous situation.

3.3. Architectural Space Arrangement in Disasters Perspective

Bugis traditional house is shown in the picture below. The figure is the cross and longitudinal section of space coordination and function in a vertical manner. Figure 4 point (a) display the vertical room function composition and point (b) display the rear part of the house in room function, also in a vertical manner.

![Figure 4. Space and room function arrangement of Bugis traditional house](image)

Architecturally, Bugis traditional house commonly known as show as the above picture in room function and it’s the arrangement. Vertically divided in three-part; lower part floor, middle part floor, and upper part floor. The lower part floor use as life stock storage, food supplies materials, like banana, coconut, firewood, etc. The middle part floor use as daily living space. The upper part floor use as storage of rice. Rice in Bugis believes as a representation of God to maintain human being life.

The sustainable living concept expressed from this good arrangement. Main source food at the top mixed with the food source from below at the middle space. Kitchen and dining area placed at the rear part of the house. Under the dining room placed the chicken cage. The symbiosis mutualism among creature well organizes in this house. Leftover food from dining falls directly to the cage area, so no waste food left.

Bugis society to sustain their life done by preparing a stock of rice as the main food sources. These materials put at the best space. Its save at the highest space at the house in the attic. They have two places for store the food, at the attic called rakkeang and on the main floor called pabareseng. Rakkeang is for raw material of rice and pabareseng is for rice ready for the cook.

A side dish of food and firewood prepare at the lower part floor. This behavior is the most important requirement to prevent life so that Bugis maintain the sustain this stock. The stock should be available in certain range time, commonly adjusted to their periodic livelihood. Farmer keep store the stock for the next year.

The architectural room arrangement described above brings to us a good lesson in handling disasters. Its contained wisdom value. The availability of enough food source is a valuable thing after disasters. This condition guarantees the people survive by them self without waiting for help or first aids. The common phenomenon after the disaster recently is the lack of food stock sources. Lack of food stock sources after disasters can be caused by famine. Famine is the most horrifying than the disasters itself. The lack of stock food reserve in the house which in disasters experiencing will be caused the community depends on the availability of helping aid. The person who saves from disasters need the basic thing in life, they need to eat first.

Description above bring to our generation the best learning in architecture principle, we called architecture good preparation after disasters. A sequence arrangement room of Bugis traditional house
become a mirror from the past in surviving to struggle against disasters. Application this architecture concept automatically set the people to be self-help to survive after disasters.

3.4. The Structural system in disasters perspective
The specific identity of Bugis traditional house in structure system is as a stilt house. This house was constructed by lifted floor elevation at a certain high level above the ground for human living space. It is high approximately three-meter high. This situation allows occupant got some benefit, such as; safe from reptile attack; free from the spreading of contamination germs. Release from the negative effect of earth temperature circulation; and safe from floodwater in a certain condition.

![Structure system of Bugis traditional house](image)

**Figure 5.** Structure system of Bugis traditional house

Learning from Bugis structure system in disaster perspective bring to us some good knowledge such as; the easy way for repaired part of the house after the disaster; the common damage part is the secondary structure, and settlement of ground is not affected foundation. Explanation of the above value is described below.

Damage part of the house structure caused by disaster allowed repaired easily. The common structure part damage caused by the disaster is the secondary structure. Secondary structure made from materials which low in quality and small in dimension compare to the primary structure. Roof and wall as a secondary structure are vulnerably destroyed by the wind. This part is easy for repair because of the joint and material dimension. The joint between the primary structure and the secondary structure are setting by pin joint and materials made from small dimension.

The end of the column is not tight to the ground in a fixed way. This condition allows the column hanging without destroying the structure. The ground settlement below the end of the column is possible to repair by adding existing elevation with the fill of earth. This principle is not only good for land settlement but also for an earthquake. The column of the house is unattached to the earth so that it's free for vertical and horizontal movement. The number of outside force that could give structure displacement when the force is more than the total weight of the house.

Figure 6 point (a) showed the column is hanging caused by land settlement at the column base point of the house site. This situation has not affected a disturbance in the structure. Figure in point (b) showed the people who replaced the roof sheet after hitting by the tornado. Replacing roof sheet at the Bugis house is an easy way because space below the roof which used as rice storage is the floor in strong enough to bearing large load. This floor is using as the place to stand for sheet roof assemble. It is no need for the special strut to prepare.
3.5. Structural Displacement in Disasters Perspective

Node displacement of the Bugis traditional house structure, analyze by modeling and simulation methods support by SAP 2000 version 14 software. The testing model has done by applied flood load in the wide direction of the house. This side used as load direction because of it wider than the front side. The Wide side of the house is more vulnerable than the front side because of the size. The side area is broad in size than the front area. Figure below shows the model of Bugis traditional structure in reality and software model. The upper left figure point (a) is the real Bugis house performance. The upper right figure point (b) is the Bugis primary structure. The lower figure point (c) is the structure model by software by load line, and the right figure point (d) is the structure section performance displacement in load disaster reach the half high upper column.

The real model of Bugis traditional performance and its structure system are used as the base of model in software. This model treated by load force and dead load to explain the structure performance in handling force. Load focus in this research is dead and flood. This load combine to make sure the structure behavior same to the natural situation when experiencing real disasters.

Software output simplicity an easy way to explain Bugis traditional structure displacement caused by flood loads. Node measurement focused at a certain point of structure vertically. Point A is the end of the column bottom, point B is the lower connection structure of the column and the first main beam from below. Point C is the second beam and column connection from below. Pont D is beam and connection over the main floor level. Point E is the upper joint between the column and beam. Point F is the fringe of the roof. Point G is the top roof.

Node displacement performance when the structure hit by flood load is display in the graphic. Structure performance elucidates in three models of flood load. The first flood load type is flood load applied at a half lower column. The second flood load type applied in full length of the lower column. The third type load applied at a half-length of the upper column. The graphic line I show structure displacement caused by the first load type. Graphic line II shows structure displacement caused by the second load type. Graphic line III show structure displacement caused by the third load type.

Structure displacement according to the I line and the II line explains the structure node moves in save way. Its displace in range of 0.19 cm at the top of the roof. This situation is not enough power to bring damage situation to the house.

The early dangerous situation detected when the flood load is reached the half-high of upper column. Node displacement in this situation according to the III line is. It is explained the movement of structure node will be happening in reverse direction. Movement from point C in positive (+) direction change to the negative (-) direction at point D. Point C and D move in a different direction as far as 2.42 cm. The contrary direction movement effect is caused by flood load crash to the wide wall area on the upper floor.
House structure in dangerous condition occurred when the water high level reaches over the floor level at a half high of upper column. In this situation, space is inconveniently for living. The man who stays at the house should leave the house to find the new save places, caused by the floor has been immerse by the water. Therefore, the human safety in Bugis traditional house has been done in a good manner.

Learning from Bugis traditional structure system safely manner for a better life could be explained in three argumentations. Such as the joint principle, the structure performance in a disaster situation and the structure elevation.

Focused on connection method, Bugis ancestor simply used joint principle. Their use joint system in a proper way. This joint called freestanding joint or dead load joint. This joint has a good implication to structure system because force distribution is limited. Moment and torsion are not transferred in this joint, the only load to transfer is the dead load. The floor structure as the primary structure constructs in this manner. The primary structure movement experience not affected to the floor structure in full power. The floor is kept quiet, that means comfortable to stay still exist although primary structure moved

![Figure 7. Software model of Bugis traditional house](image)

![Figure 8. Joint displacement of Bugis traditional house caused by food load](image)
The lesson from Bugis house structure system performance indicated that the dangerous situation of the structure occurs when flood level high reach at above the floor level. When the floodwater level high reaches this level, it is simply understood that space is not possible and unsatisfied for stay. This phenomenon seems to be an early warning system to the occupant to leave the house. It is like an announcement that the house in a dangerous situation. Time and opportunity to leave the house for a safe self is good enough.

The lesson from an elevated floor of Bugis structure system as a stilt house that using two-floor level structure can be explained. The first floor for living area and upper floor at the under roof (attic room) for rice storage function space for temporary evacuation. Floor for daily activity level house located at +3 meters high above the ground. The floor under roof or attic located ± 5.5 meters above the ground. The elevation at the high position like this simple known exist in save from flood threat. Figure 3 point (c&d) is the evidence of Bugis traditional house as a stilt house safer than the landed house from flood.

3.6. Policy Development Suggestion

Based on the explanation in the discussion of Bugis traditional house, the policy suggestion for helping people to save from disaster can be arranged. Suggestion can be a divide into two categories, land use policy, and community awareness. Land use policy suggestion to create proper regulation related to the best building structure in water immerse region. Structure system classification suggested applied proper to the hierarchy of water immerse in the region. The immerse region can divide into three zones; such as the high land in a free immerse zone; the middle-high in periodically immerse zone; and the low land prone immerse zone. Free immerse zone suitable for the landed house structure. Periodic immerse zone suitable for semi stilt house structure, and prone immerse zone suitable for the stilt house structure. Implementation structure system in proper to the topography as like this suggestion allow settlement will be free from load disaster or at least minimize damage. Figure 2 point (b) is the evidence of spreading flood water following the land topography surrounding the river.

![Figure 9. Policy suggestion for building structure and land use.](image)

Community awareness related to living style. Daily habit to manage a good life is better to follow Bugis tradition to sustain their life. Each home should have a food stock reserve and the component of making food. This stock should be available in a certain range time according to livelihood income. The main food source should be guaranteed the existence is rice, ingredient, a side dish of food materials and firewood. The availability of this stock will be valuable when unpredictable disaster happened. The post-disaster phenomenon which experience recently is how to survive after disaster become the horrifying thing. The people who escape from disaster will require food or eat to sustain their life. The imaginable condition can be depicted, what happens if disasters occur in a remote area without food stock?. Infrastructure facility impossible allowed helping teams to delivered assistance quickly. The assistance late can be caused by the death toll by famine, not by the disasters itself. The death toll caused by famine is more horrible than the death cause of disasters.
4. Conclusions

Ancient society has been exceeding their generation by filling it with culture and technology invention according to the ability level at the era. This masterpiece is the base of the development of knowledge invention in the modern era. The technology invention in the past is full of wise meaning. Structure system of Bugis traditional house has been proof they ingenuity in high quality to serve human live inconvenient way. It is filled with pure value to maintain comfort and safety event from disasters. This value is applied in architecture arrangement and structure system. Architecturally, this house is setting the room as learning to survive after disasters by equipped food storage in the safest place at the highest elevation. Structure system function as the early warning system to safe live through their performance in displacement caused by flood load. Structure in an emergency when the floodwater rises at a half high column at the upper floor level. Frame structure system provides living space at a high elevation. This space constructed about 3 meters high above the ground surface. This condition brings some benefit to the occupant especially in free from flood disasters. The lower part of the house constructed from a slender column which allows water flow in freeway without obstruction. Free space at the bottom house is not only for water flow but also for flood protectors. Specifically, Bugis ancestor has been teaching to the next generation in how to prepare and how to survive in disasters. Room coordination in architecture arrangement of Bugis traditional house which prepares a special place for food stock is the fundamental principle in surviving from disasters. The application of free-standing joint allows floor structure not affected by the main structure displacement. Structure system design in consideration of easy maintenance is good learning.

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