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Review Article

3S and 4N Concept as Independence Being Victims in Post-Earthquake Reconstruction

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ABSTRACT: Victims of the 2006 earthquake in Bantul realize and accept the fact their homes have been léséh (destroyed), but they remain be grateful that ruins was still at their homes location . Awareness is encouraging to conduct an inventory and reuse of building materials to build a house ruins after the earthquake. This study is to find answers to the problems: how is the concept of reuse of building materials ruins, and the role of building materials ruins in realizing the building after the earthquake? This study focuses on post-earthquake houses were built independently. The experiment was conducted in a naturalistic paradigm with qualitative methods. The results of this study is the concept in the reuse of the rubble on independent reconstruction after the earthquake in Bantul, the concept 3S (sakanané-sakisané-sakdadiné) and 4N (niteni-niroaké-nambahaké-nemoaké).

Keywords: post-earthquake, reuse, ruins, independent, 3S, 4N

I. INTRODUCTION

The phenomenon that occurs in the reconstruction post-quake Bantul Yogyakarta show their reconstruction through the housing assistance program. The housing assistance was built with the various design, structure, and management development in accordance with the background of the donor [1]. Various concepts promoted by the reconstruction aid in implementing reconstruction assistance [2].
The reconstruction is based on the ideas of structural, architectural, and economics [3]. Aid with a variety of different background to implement the ideas based on the concept that different also. Meanwhile various directives reconstruction can not automatically be applied to each case after the earthquake, because aspects of the structure and the different architecture [4].

The formal reconstruction is oftenless attention the availability of local materials, with a building form that lacks local wisdom [5]. That situation resulted in many formal reconstruction results with occupancy occupancy rate is not the maximum {6}. Thus pemanfaan back even recycle material could be an opportunity for the implementation of the post-quake reconstruction {7].The structure of the building with local materials recycled even have a good quality if the user correctly with the correct design [8]

On the other hand, the post-quake Bantul-Yogyakata 2006 found the existence of earthquake survivors who build their own homes, conducted own jointly family or community, with reuse of material ruins of his house, before any aid or assistance either from the government or donations [9]. That phenomenon shows the uniqueness in each of the buildings associated with the availability and use of materials, construction technicalities, as well as the idea and form of the building [10]. Reuse of building materials post-disaster, that people choose to collect debris building materials their homes, selecting and reuse [11]. That reuse is saving energy and capital, although this is still little applied to strategy reconstruction formal post-disaster[12] This is caused by the parties disaster managers feel more uncomfortable with the use of old material, so as to make exceptions to the standard construction [13].

From the description above needs to be disclosed the informal practice of reconstruction or independent reconstruction post-earthquake in Bantul by way of reuse of materials ruins building.

This is related to: how the concept of reuse as well as its role in realizing the post-earthquake building? It is expected to generate understandings of victims in conducting the reuse the ruins of building materials, as well as contributing a wealth wisdom of post-quake reconstruction .

II. MATERIAL AND METHOD

The focus of the study was to observe the building with the use of building materials ruins. So that the focus is not grown too wide then the initial criteria need to be established although it did not rule out developing next time in the field. The initial criteria is: building the house after the earthquake of up before reconstruction assistance implemented, carried out independently without the help of reconstruction funds from the government or agencies of donations, the building was built with a construction that utilizes the material ruins and buildings until now still functioned, and there is active development actors that will provide information

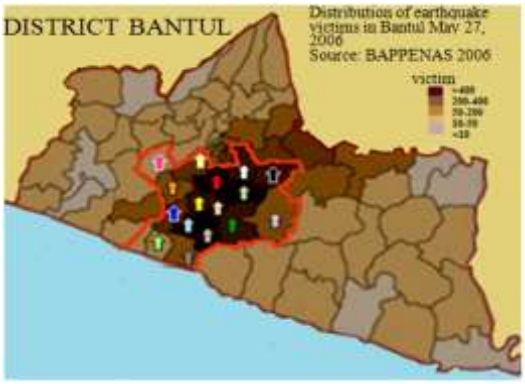

Fig 1. Location of the study

Fig 2. Independent houses reconstruction post- earthquake of 2006 in Bantul

Source: personal photos

This research was conducted in the Bantul district, as the region suffered severe damage in the earthquake of 2006 [14]. The locus of research is the area with the highest damage, assuming residential buildings collapsed during the earthquake. Based on the reduction process on the criteria that had been developed, the first reduction process (based on the criteria 1) pursing four sites of 15 existing areas. Second reduction (based criterion 2) refers to two locations from five regions, while the third reduction (based on criteria 3 and 4) determine one of the two regions as a selected location in Bambanglipuro area. The Bambanglipuro area were selected villages therein Mulyodadi includes several hamlets : Pete, Wonodoro, Demangan, Bakungan, Bekang, Kepuh, and Carikan. Data were obtained by direct observation: researchers met with the respondent. Observations carried out to obtain physical data by measuring and recording: sketches and photographs. Interview or interview was also conducted with the active and passive actors associated with post-earthquake reconstruction.

Victims described the ruins of buildings in some circumstances. Kandhang is a building made of concrete columns construction (10/10/250) with a wooden roof frame, building a structure truss system without using the wall charger components. joglo mostly collapsed, brunjung standing amid the ruins of the building, however, eventually broken down by their owners. Brick partially changes the shape into small debris, and some are still in the couples tend intact. The size of the wood turns into short because the process of collapse resulting in damage. However, most of the wood still in its original size, despite experiencing a clash when collapsed.

Victims of managing ruins to obtain the appropriate types and functions of building materials.Building materials are classified as forming appearance, strength, and building fillers .Framer components of the building force include of wood and brick. Wood group is a type of wood ruins covering the columns, the roof frame (nok, purlins, rafters, battens), and wall or gebyog.Groups of brick is a red brick and roster. Framer components of the building appearance: doors and windows. While the filler component of the building in the form of furniture includes wardrobes, shutter, tables, chairs, and couches.

Fig 3. Building materials ruins are grouped according to the classification of forming strength, appearance, and fillers building

Source: personal photos

III. RESULTS AND DISCUSSION

Reuse of building materials ruins to build a house in activity post- earthquake showed the presence of several typologies. First, the use of materials of the type of building and the type of material is different but function the same material. Second, the use of materials of the type of building and type of material, the same material but with different functions. Third, the use of materials of this type of building, type of material and function of the same material.

In the first type, material of concrete in buildings cowshed used to replace the use of wood materials that are commonly used in residential buildings.Its use fixed or the same function as columns. Cowshed owned by most villagers region

Mulyodadi village, construction of concrete columns in the cowshed did not have collapsed during the earthquake, so that the victims of the earthquake inspired to use them in the manufacture of home after the earthquake.

The type second, the use of materials of the type of building and type of the same material but with different material functions. In this type occur two variants or cases. The first case of this type is associated with the use of wood materials rafter. The absence of appropriate wood material dimension to function as sawbuck, and a rooftop, then used a wooden rafter modified for these functions. The third type is of a type of building, type of material and function of the same material. The wood columns, gebyog, frames, and red brick . The use of wood as a function original but with a change in length of the stem because of a fracture at the time of collapse. The first case of this type, namely the reuse of wood for the column function, but the length of the column is shorter than the previous size. The resulting building has a height of 2,5 m + column, whereas in the previous building measuring 3 m - 4 m.

Reuse of building materials ruins capable of up to 100%. Domination reuse of building materials ruins demonstrate the role of skill-building and the degree of independence of the victim.

TABLE I USE OF RUINS BUILDING MATERIALS AND NEW BUILDING MATERIALS

PEB	Wall (m^2)		Roof (m^2)	Σ BMR (m^2)	NBM (m^2)	% BMR	% VBBR
	outsider+in	Σ					
1	72.5+35	107.5	57.75	165.25	35	**78.82**	**21.18**
2	95.0+25	120	56.5	176.5	-	**100**	-
3	80.0+15	95	35.5	130.5	32	**75.48**	**24.52**
4	96+45	141	69.5	210.5	74.75	**64.49**	**35.51**
5	87.5+46.25	133.75	72.5	206.23	35	**83.03**	**16.97**
6	157.5+32.5	190	126.5	316.5	65	**79.46**	**20.54**
7	42+18	60	29.5	89.5	-	**100**	-
8	72+16	88	35.5	123.5	-	**100**	-
9	108+45	153	80	233	36	**84.55**	**15.45**
10	56+12	68	34	102	-	**100**	-
11	108	108	89.5	197.5	85	**56.96**	**43.04**
12	60+17.5	77.5	38.5	116	-	**100**	-
13	67.5+11.25	78.75	44.5	123.25	-	**100**	-
				Average (%)		**86.47**	**13.53**

Information :
PEB: Post-Earthquake Building
BMR: Building Materials Ruins
NBM: New Building Materials
Source: surveys and measurements (2013, 2015)

The ability to reuse in practice independently reconstruction post-earthquake in Bantul involve deeper thought, not just practical-technical side. Reuse material ruins involves thinking and technical ability, the ability to choose the material of the ruins and reassembled in the form of new buildings. Experiences and cultures inhabit before the earthquake also provide direction for managing and revive the potential of the material. Reuse material ruins are also able to adapt to the post-disaster living conditions so as to evoke the spirit to rebuild after the earthquake. Earthquake victims in Bantul in practice independently mapped reconstruction in some way of building typology set up by a factor of human and material resources.

First, the victim doing all the reconstruction process along with members of his family and the people near her home. This type has a tendency to reuse the material rubble as building materials as a whole. This type is backed by the potential skill-building owned by the victim and his family members. The victims on the basis of the work as farmers have been accustomed to doing menial jobs. They accustomed to do gotong royong making village road, the construction of the mosque, construction of guard post, and so on. At the time of waiting harvest for those accustomed to using to do glidig (sideline) as a labor-building. By having experience in the jobs, they have experience about building a house. They apply the things you've seen and experienced to immediately realize the shelter post-earthquake.

The victim in a state of limitations of trying to survive. They are armed with the ability sorting and selecting ruins. Victims promoting a sense of gratitude and a sense of responsibility towards the family. It is a force to be independent, exert all abilities. Victims tried to recall the experiences of the practice of making house obtained from pay attention artisan at work and the victim tried to imitate, even adding material appropriate to the circumstances they face.

The second, the victim utilize a network of kinship or friendship. This type carried the victims on the basis of a job as an office worker (ngasta), bakul (market vendors), artisan senso (saws), and artisan hooler . They are less or even not have the skill to build, so take advantage of relatives and colleagues at work to help realize residential construction after the earthquake. Circle that exists between the victim with relatives and their friends to do a splice,work together without asking for reward money. In this type of material use more varied ruins, overall usage to only partially. This condition occurs because of access to new building materials become larger if the network of relatives and friends of work from other areas that are not affected by the earthquake.

Victims together relatives and colleagues with material capital ruins rebuild their house. They do based on what they've seen from the practice of building a house, and then imitate and practice, even among the victims there were able to do a new creativity they have not done before.

Besides, generally the victims of the 2006 earthquake in Bantul has a passion for independently is very high. They have a variety of ways to motivate himself and his community. They expressed in the form of expressions of verbal nék nyerah tambah parah, nék nunggu ra bakal maju" (if you give up to get worse, if you wait will not go forward), "bantuan ora milli saklawasé, sakiki wektuné tumandang gawé" (aid does not flow forever, it is time to work), and "kapok ngemis,

korban gempa malu jadi benalu" (deterrent begging, earthquake victims are ashamed of being a parasite).

The findings in this study demonstrate the concept and idea behind of the building material reuse the ruins. Victims in the process of sorting, selecting, by reusing building materials ruins based on the ability niténi (remembering), niroaké (imitate), and nambahaké (add), and even further capable nemoaké (find, initiated) the birth of creative work addressing the lack of building materials. Niténi, victims are able to read, pay attention to the phenomenon by bringing back the experiences that have been obtained in the case of residential building techniques and the use of building materials. The victim's social background has equipped various knowledge of building natural materials.

Victims are able to choose and sorting material ruins so that mapped back usefulness. The knowledge and experience that has been obtained naturally in relationships and daily life provides a guide to identify the feasibility of a building material, and classify building materials in accordance with the purpose of utilization.

Niroaké, victims are able to apply what is remembered and the experiences that have been obtained. Victims were only armed with makeshift skills , *sakisané* (his best) imitate and practice by utilizing *sakanané* (roughing) building materials. Victims in this comprehension levels have been able to reuse building materials that have been sorted and selected by applying its knowledge of the management of building materials. *Nambahaké*, victims are able to manage the building materials in accordance with the new circumstances in the shape of the building is generated.

Gebyog which was originally in the form of vertical grid reassembled in a horizontal position adjust the height of the building is generated. This situation is a reflection of the attitude of the open attitude *gematén* (nurture and care) as well as an understanding *aji* (valuable) and *migunani* (useful). Adaptation of building materials that exhibited by victims in cases that have been mentioned in front showed a high sense of belonging despite being in ruins, even still considered valuable and we believe will give a great benefit for life. Then the state of the building materials remain diopéni making sure to still be used. When faced with new conditions were different, the victim made a breakthrough creativity with technical touches *nambahaké* namely by turning 90º gebyog grid pattern, so that the building materials remain unused without significant overhaul.

Thus gebyog that as *bandha- donya kang aji* (property value) can still *kadhep* (awake), *kesawang* (visible), and *nyantosani* (strengthens) for life.

Nemoaké (find, initiated), the victim was able to bring creative work addressing the lack of building materials. Depth of understanding is seen in the application of the method of use of building materials that ora loose short-sighted. Limitations of building materials faced with the need of building materials in the size of the long and large dimension, encourage victims to think fast and precise. Thus was born the creativity, *dhalang ora kentékan lakon* (puppeteer did not run out of stories), *pandhé ora kalah karo wesi* (smith was not defeated by iron), availability of rafters in length and limited dimensions in the "magic" into *balungan* (bars-sized) that horses and beams latai. Additionally leap occurred when the victim mensikapi creativity domination intact availability of wood building materials. Victims recall the memory of his admiration for *joglo* owned neighbors. For him is an honor for someone who has *joglo*. Victims harbored the desire to own a home *joglo*, he wished someday to build *joglo* as a representation of *Kamulyan*. So when her house collapsed and debris form dominated by wood intact, victims decides to realize their dreams despite the length of timber sizes do not fully meet the standard dimensions of the building *joglo* in general.

Physically product resulting from the process of re-utilization of the ruins of fortified building materials philosophy-tinged grooves *sakanané- sakbisané- sakdadiné* uniformity that vary according to the adequacy of individual building materials available ruins. This can be explained bring uniformity means that the attributes of physical culture that is always attached to the building generated as influenced by the characteristics of building materials which are formed by the local culture. While diversity is formed by the willingness and ability of individuals who would have been different. Acceptance of the reality of building material in the rubble and independent user through the process of returning a typical local wisdom on them.

Reconstruction management independently by reusing building materials ruins relationships between the ruins of the building materials, internal labor-eksternal, and new building materials. The relationship of the three aspects terlandasi by philosophy *sakanané* (roughing), *sakbisané* (his best), *sakdadiné* (finished). *Sakanané*, linked with live view *narimo ing pandum* (accept what God), interpreted by the victim that the ruins of building materials is a gift, even though the building had collapsed, but the Lord was pleased to leave the materials that still allows to be used. Victims rely on *kasunyatan* (the fact) that has provided material even in a state *sakanané*, then used fulfilling his wish to have an immediate return home. *Sakanané* life outlined in the concept *urip sakmadya* (simple life), *ora ngangsa* (no ambition), a live-style rural communities in Bantul in their daily lives. How to work, interacting, and spoken-word part of their simplicity.

Sakbisané, views fruitfulness in the attitudes of independence that rests on the ability of himself. This attitude emphasizes the willingness and ability of a person to not rely on the help of others. Victims as farmers address the culture of *paguyuban* (harmony and mutual assistance), *sambatan* (mutual help) stimulate his active role in the activities together and helping to complete the jobs in the fields. The urge to act *guyup* (pillars) are applied actively, meaning they seek to actively contribute to the mutual assistance to one another, not otherwise rely on others first act against him. So in their daily life away from the habit *njagakké* (relying) *pitulungané liyan*

(help from others). They have been accustomed to working hard and finish the job with or without the help of others. On the other side of the view, they also recognize the concept of orders yet, that someone is able to get out of trouble or desired target with his best attempt way without relying on the role and help others.

While *sakdadiné* is understood associated with *pasrah-sumarah* (surrender),to feel the satisfaction of working without any achievement in polluting by feeling disappointed or envious of the achievements of the labor of others. The views fruitfulness in the sense *panuwun* (gratitude) and *ketrima* (grateful).Victims more process-oriented, highlighting the spirit and goodness lived in taking a job that is grateful and optimize the existing resources and far from any future disillusioned with the results obtained.

IV.CONCLUSIONS

Victims of independently performing residential redevelopment of post- earthquake rubble to reuse material. Its use is based on the level concept of 4N: *niténi-niroaké-nambahaké-nemoaké*, and the optimization of resources based on the philosophy 3S: *sakanané-sakbisané-sakdadiné.*

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