Post-quake Condominium Reconstruction for Taiwan Chi-Chi Earthquake in 1999

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Abstract
During the Chi-Chi Earthquake, approximately 26,000 condominium housing units were completely destroyed or half damaged, yet till now, only four condominium communities have been reconstructed. In order to accelerate the reconstruction of condominiums, it is necessary to investigate the factors involved. In this research, field investigation and interviews are taken as methodology to analyze the reconstruction problems and to suggest a reconstruction principle for condominiums. As a result, factors including residents’ organizations, negotiation with construction agents and banks, reconstruction types, and government administrative efficiency will be discussed.

Keywords: Taiwan Chi-Chi Earthquake; condominium; housing reconstruction

Introduction
During the Chi-Chi Earthquake, approximately 105,000 housing units were fully or half destroyed; and among them, approximately 26,000 units were condominiums. For the reconstruction of condominiums, apart from the Special loan program of Central Bank, the 921 Post-quake Reconstruction Foundation also launched a series of reconstruction projects to assist reconstruction of condominiums. Until April 2001, 8,464 units, approximately 53.2% of half the destroyed condominiums, had been repaired (921 Earthquake Post-disaster Recovery Commission, 2001); however, only 969 units, approximately 9.2% of the completely destroyed condominiums (921 Earthquake Post-disaster Recovery Commission, 2001a), had shown significant progress in reconstruction. Compared with the reconstruction progress of half damaged condominiums, among them over 50% have been completely repaired, however the reconstruction pace of completely destroyed condominiums is rather slow.

To analyze the reasons why the reconstruction of completely destroyed condominiums is moving at such a slow pace, it is found that reconstruction problems mostly resulted from issues such as “difficulty to reach construction consensus” or “financial and loans problems of residents”. Condominiums reconstruction(1) can be mainly divided into categories, such as “same-site, same-scale rebuilding(2)”, “urban regeneration(3)” and “relocation of rebuilding”. Among them, urban regeneration is highly recommended by the government (921 Earthquake Post-disaster Recovery Commission, 2001b); however, due to the difficulty of exchanging a public land, there is yet no previous example of relocating rebuilding.

Method
In this study, a comparison of reconstruction processes and models of four condominium reconstruction cases, which have shown significant progress in reconstruction, is provided. Data were gathered from field investigation and interviews regarding the reconstruction of two condominiums based on urban regeneration and another two based on same-site, same-scale reconstruction. The purposes of this research are to analyze the solution to reconstruction problems and influences (the reasons affecting reconstruction progress), and to try to provide reconstruction principles for current condominium reconstruction plans in damaged areas.

Actual Condition of Condominium Reconstruction
Please refer to Table 1 for damage condition of over five-story condominiums (921 Earthquake Post-disaster Recovery Commission, 2001). Until April 2001, 15,899 condominium units, totalling 151 buildings have reported half damaged, and 8,464 units, totalling 69 buildings, have been repaired. 10,537 units have been reported as totally destroyed and 8,235 units have been torn down. Most of the condominium reconstruction plans are based upon types of urban regeneration and same-site, same-scale reconstruction (See Table 2). Until the end of June 2001, 56 communities had set up regeneration committees (a total of 6,789 units), and among them, about 183 units were reported half damaged. However, among 56 communities, only 8 communities have passed the review of urban regeneration plan (921 Earthquake Post-disaster Recovery Commission, 2001a). In addition, 14 condominium communities have adopted same-site, same-scale reconstruction, totalling 794 units, while only three communities (191 units) have undertaken reconstruction (921 Earthquake Post-disaster Re-
Thus it can be seen that, from the above data, over 50% of half damaged condominiums have been completed repaired. Concerning the reconstruction of totally destroyed condominiums, around 60% are reconstructed based on urban regeneration plans, while about 13% will be rebuilt based on same-site, same-scale rebuilding. Regarding the remaining units, the reconstruction method for approximately 30% of the totally destroyed condominiums has not been decided. Although reconstruction of over 70% of totally destroyed condominiums has been proposed, reconstruction action has been taken for only less than 10% of them.

Analysis of Reconstruction of Four Condominiums

It can be seen in Table 3 that the Ming-liu Building and Swei-dao No. 7 Building adopted the urban regeneration reconstruction plan, while Swei-dao No. 9 Building and Yuan-chen Building adopted the same-site, same-scale reconstruction plan. Each reconstruction plan of these four communities will be discussed respectively as follows.

1. Ming-liu Building

(1) Reconstruction type and process

After the earthquake, the building was reported totally destroyed. Due to the close association among residents, the residents committee decided to tear down the building on Sept. 26, 1999 and a reconstruction committee was setup on Oct. 6, 1999 (4). Residents in this community have reached a consensus on same site, same scale reconstruction. However, considering the earthquake resistance of buildings, the structure of the building has to change from the L-shape to square shape (see Fig. 1), resulting in property right exchange problems. After negotiation that lasted four months, this community decided on Feb. 12, 2000, to adopt the urban regeneration reconstruction plan, and an urban regeneration reconstruction committee was set up with the assistance of the Urban Regeneration R&D Foundation. Please refer to Table 4 (921 Earthquake Post-disaster Recovery Commission, 2000), for reconstruction process of this condominium. On April 20, 2000, the full proposal for the urban regeneration plan was sent to the local government for review. Because this is the first urban regeneration reconstruction case and the local government was not familiar with urban regeneration policies and implementation processes, it took four months for the local government to approve urban regeneration proposal. As for reconstruction loans, an investigation of residents’ original loans started on April 3, 2000. On May 8, a reconstruction loan meeting was held and residents also started to contact banks for discussion regarding cancelation original loans and union loans.

(2) Reconstruction problems and solution

a. Temporary liaison stations set up a database of the residents’ personal information in order to unite their collective desire for reconstruction.

b. The 921 Post-quake Reconstruction Foundation re-
place those who are not able to participate in reconstruction by reconstructing with other residents\(^{\text{13}}\).
c. Implementation reconstruction is undertaken along with negotiation and legal case against construction agents.
d. Low administrative efficiency: it took almost one year for urban regeneration programs to begin because this is the first case of urban regeneration reconstruction in Taiwan.

2. Swei-dao No. 7 Building

(1) Reconstruction type and process
Before the earthquake, residents in this community maintained a close association with each other, and after the earthquake, a temporary organization was set up by the community committee to dispatch mails and consolation money\(^{\text{16}}\). Yet this community still exerts a lot of efforts in negotiating with construction agents, and by April 2000, residents had reached a settlement with construction agents and received four housing units of houses as compensation. The reconstruction committee of this community was established on Oct. 31, 1999. Originally they proposed same site, same scale reconstruction, but residents survey results on April 20, 2000 revealed that there are six residents units who did not want to reconstruct and the original building structure was destroyed due to the earthquake (see Fig. 2). Thus on July 12, 2000, residents decided to adopt the urban regeneration reconstruction. However, because they spent too much time in negotiating with construction agents for compensation and by the time they decided to adopt the urban regeneration reconstruction, only 30 units were willing to take part in reconstruction. An urban regeneration committee was set up on Sept. 26, 2000, and on Feb. 22, 2001, the full reconstruction plan was sent to the local government for examination. On May 20, 2000, a construction license was issued and the construction agent will be decided in August. As for original loans and negotiations with banks, residents began to negotiate with banks in July 2000, however, because foreign banks and private banks do not want to grant construction loans, residents are still carrying out on

Table 4. Reconstruction process of the Ming-liu Building

| 1999.9.21 | Earthquake took place. |
| 10.6     | Agreeing to reconstruct the condominium in initial style. |
| 2000.2.12 | Deciding condominium as the urban regeneration site. |
| 3.25     | Deciding to set up a regeneration committee to undertake urban regeneration through residential meetings. (Reconstruction preference) |
| 4.3-4.26 | Investigating the original loans of condominium residents. |
| 5.8      | Sending documents of urban regeneration committee to the local government. |
| 9.27     | Holding original personal-loan negotiation meeting with bank group. |
| 9.28     | Formally setting up urban regeneration committee. |
| 10.4-27  | Discussing construction plan and details. |
| 11.29    | First loan meeting with banks regarding union loan. (Negotiation with the bank group) |
| 2001.3.26 | Setting loan meeting with banks regarding union loan for condominium construction. |
| 4.18     | Passing examination of property-right-distribution plan. |
| 5.14     | Getting construction permission. |
| 5.22     | Third loan meeting with banks regarding union loan. (Negotiation with the bank group) |
| 5.31-7.11| Negotiating with construction agent by residents. |
| 6.5      | Discussion regarding joining the housing reconstruction program No. 7 of 921 post-quake reconstruction foundation. (Exterior co-reconstruction) |

Fig. 1. Comparison of pre-quake and post-quake plan of the Ming-liu Building.

Fig. 2. Comparison of pre-quake and post-quake plan of Swei-dao No. 7 Building.

Source: Pamphlet of the Swei-dao No. 7, 2000
negotiation with banks continuously (921 Earthquake Post-disaster Recovery Commission, 2000a) (see Table 5).
(2) Analysis on reconstruction problems and solution
a. Reaching consensus: At an early stage, temporary resident associations were set up to keep residents in contact. However, the committee took too much time in negotiating with construction agents which resulted in a reduction of residents’ willingness to reconstruct.

b. Negotiation with banks: Because many foreign and private banking sectors do not want to accept reconstruction loans(7), and residents have not reached a consensus toward a reconstruction plan either, the urban regeneration committee have to continue to negotiate with banks regarding loan problems before a full agreement concerning reconstruction plans can be reached for the application for construction loans.

c. For those who do not want to participate in reconstruction, the community applied the housing reconstruction support plan in which the 921 Post-quake Reconstruction Foundation participates in reconstruction with community.

3. Swie-dao No. 9 Building
(1) Reconstruction type and process
After the earthquake, a temporary organization was set up for liaison and dispatch of consolation money(8). Compensation negotiations with construction agents began in October 1999, and in April 2000, they had come to a settlement with construction agents. On the other hand, the reconstruction committee was established in October 1999 for negotiations with construction agents and communication with residents regarding a consensus on reconstruction. Since March 2000, an external reconstruction team was assigned by the Nan-to Government to assist community reconstruction.

Because residents are satisfied with the original building style and also because the building structure was not damaged seriously during the earthquake (see Fig. 3), residents decided on March 18, 2000, to adopt a same-site, same-scale reconstruction plan. On July 9, 2000, a construction license was reissued and a construction agent was also selected by the residents. Reconstruction started on Sep. 20, 2000. As to the original loans, the reconstruction team started to negotiate with banks from April 2000 for new reconstruction and united loans, and had also received 10% of loans granted from banks (921 Earthquake Post-disaster Recovery Commission, 2000b) (see Table 6).

(2) Analysis on reconstruction problems and solution
a. The temporary association maintains the liaison with residents from an early stage. After the reconstruction committee was set up, it maintained communication with resident to reach a consensus regarding reconstruction, while negotiating with construction agents at the same time.

b. For those who do not want to take part in recon-
struction, the reconstruction committee will arrange buyers or persuade neighbors to buy up the properties.

c. Those who can not pay the interest on the original loan calculated from Sep. 21, 1999 to the day that the bank decided to cancel the original building loan, the residents’ committee pays part by installment.

4. Ta-li Yuan-chen Building

(1) Reconstruction type and process
Because the president of the committee is a soldier, a temporary resident association is set up within one week to keep contact with residents after the earthquake took place, and a reconstruction committee was set up on Nov. 20, 2000(10). Due to location of the building and because no one was injured during the earthquake, condominium is still valuable after reconstruction and thus it is necessary to obtain the consensus from all residents regarding the selling price of the building. Also, because the structure of the building was not damaged during the earthquake, and after negotiating with the original architect, residents decided to adopt same-site, same-scale reconstruction on March. 20, 2000 (see Fig. 4). The original architect was hired to guide the reconstruction and the building was torn down on July 12, 2000. Since June 2000, the reconstruction committee progressively negotiated with banks for loans, and a construction license was reissued on Feb. 27, 2001 (921 Earthquake Post-disaster Recovery Commission, 2000c)(see Table 7).

(2) Analysis of reconstruction problems
a. During the first stage, a residents association was set up under a strong leadership to keep contact with residents, and a reconstruction committee was established quickly in order to start reconstruction.

b. The residents committee persuaded three groups of residents who did not want to reconstruct, to agree to do so within one month. The community thus obtained 100% agreement to rebuild the condominium.

c. Due to the inability of construction agents to reconstruct, the reconstruction committee wishes to cooperate with other construction agents for reconstruction, yet they are still negotiating with those construction agents regarding economical construction costs.

d. For those units who are financially unable to join in the reconstruction, the committee found it difficult to negotiate with banks to share the loans, but still they continued the negotiations. However, because some residents cannot take out new loan(10), no loans were available to commence the reconstruction.

Analysis of Condominium Reconstruction Factors

An analysis of four condominium reconstructions, its process and some factors affected its pace are shown in Fig. 5 with descriptions are as follows:

1. Reconstruction preferences
From the four cases above, it is seen that the reason for adopting the urban regeneration plan focuses mainly on pre-quake structural problems. In the case of urban regeneration, 100% agreement from residents is not necessary, but is based on a majority decision in which agreements and property right achieve 1/2 of the number of residents’. Besides, the 921 post-quake reconstruction also provides funds to support those who set up an urban regeneration plan and property-right-distribution plan; to cover the risk involving less than 25% of residents who do not want to participate in reconstruction, 921 Post-quake Reconstruction Foundation directly participates in condominium reconstruction with residents. By contrast, to the case of same-site and same-scale reconstruction, it is necessary to obtain 100% agreements and rights from residents. However, the risk of such reconstruction is that it is difficult to obtain such 100% agreements and rights of residents, and it may take a long time to negotiate with those who do not want to reconstruct or for neighbors or others from outside to

Table 7. Reconstruction process of the Yuan-Chen Building

| Date    | Event                                                                                       |
|---------|---------------------------------------------------------------------------------------------|
| 1999.9.21 | Earthquake took place.                                                                     |
| 10.15-27 | Started discussing with construction agent for compensation. (Negotiation with construction agent) |
|         | Held residential meeting twice for contacting with residents for reconstruction. (Residents organization) |
| 11.20   | Established reconstruction committee and negotiating with residents for reconstruction. (Strengthening 100% agreements of residents) |
| 2000.3.20 | Accepted original architect to reconstruct condominium according original plan.             |
| 5.15    | Asked local government for supporting taking off original building loans.                    |
| 6.14    | Held negotiation meeting with banks for original loans.                                      |
| 7.12    | Removed completely damaged condominium.                                                     |
| 10.5-11.10 | Selected cheapest construction agent for contracting.                                       |
| 12.5-10 | Negotiating details of original loans and union loan with banks. (Negotiation with the bank group) |

Fig. 4. Reconstruction plan of the Yuan-chen Building.
buy those people’s property in order to achieve reconstruction under 100% agreements. Therefore, to compare with same-site, same-scale reconstruction, adoption of the urban regeneration plan is a less risky form of reconstruction. Compared with the time taken in reconstruction, urban regeneration will take much longer due to the local government’s review and negotiation with the banks than in the case of same-site, same-scale reconstruction if no problems occur such as negotiation with the banks or those who do not want to reconstruct. For instance, same-site, same scale reconstruction in Swei-dao No. 9 Building was faster than in the Ming-lui Building and Swei-dao No. 7 Building which adopted urban regeneration; however, the reconstruction of Yuan-chen building that is also adopting same-site, same-scale reconstruction is slow due to the problems described above.

2. Residents organization

After the earthquake, residents were relocated to different places, and temporary associations were established to keep in close contact with residents and through resident associations, so that residents can reach consensus toward reconstruction. Later a reconstruction committee was established to direct community reconstruction. Thus it is found that establishment of residents associations and through such associations to unite residents regarding consensus towards reconstruction is a crucial factor for condominium reconstruction, no matter whether based upon urban regeneration or same-site, same-scale reconstruction plans.

3. Professional team support

Because this is the first time to adopt the urban regeneration technique for condominium reconstruction, especially with respect to preparing an urban regeneration reconstruction plan and property-right-distribution plan, therefore it is very difficult to implement such techniques without any professional support. For instance, the Ming-lui Building is under the guidance of the Urban Generation R&D Foundation, while the Kwo-hwa Chu Architect Office supports the Swei-dao No. 7 Building. On the other hand, in the case of the Swei-dao No. 9 building’s reconstruction, although the residents decided to reconstruct a condominium by adopting same-site, same-scale construction, professional team also needed to negotiate with residents to achieve 100% agreement; to those who do not want to reconstruct, the professional team also found others from outside to buy their property to join the reconstruction; besides, the professional team also provided information regarding construction agents. On considering the pace of the reconstruction progress of condominiums, not only regarding urban regeneration reconstruction but also same-site, same-scale reconstruction, the support from professional teams plays an important role.

4. Reconstruction and negotiation with construction agents

It is inevitably costly in both time and effort to talk with construction agents concerning compensation and negotiations, and there are sometimes cases in which construction agents have evaded or been unable to compensate or become wholeheartedly involved in reconstruction. As a result, residents have spent a lot of time and money in raising lawsuits against construction agents, yet found such effort to be of no avail. Thus from study of the above four cases we found that it will be less costly and more positive regarding condominium reconstruction if residents can negotiate and reach reconstruction consensus with construction agents, or even cooperate with them concerning the reconstruction.
5. **Exterior co-reconstruction**

Due to the fact that residents’ economic capabilities vary and they may also have various personal loans with banks, they may not be able to buy up properties of those who do not want to join condominium reconstruction or they may not obtain loans from banks for reconstruction. As a result, attracting external financial sources to support reconstruction will be necessary. For example, it would be necessary to apply the housing reconstruction program No. 7 of the 921 Post-quake Reconstruction Foundation for same-site, same-scale reconstruction.

6. **Negotiation with financial institutions**

From the reconstruction cases mentioned above, it is found that residents usually have to constantly negotiate with banks to cancel an original loan and re-borrow new reconstruction loans and this is inevitably an obstacle and restraint regarding reconstruction. Thus to accelerate condominium reconstruction, it will be necessary to enhance the negotiation and communications between banks and residents.

7. **Improvement of government administrative efficiency**

It is shown from the above discussed cases that local government institutions are not familiar with urban regeneration policies and implementations and usually take a long time with paper work. Inevitably low administrative efficiency is an obstacle to reconstruction. As a result, it is necessary to re-educate government administrative units and to establish professional institutions to speed up reconstruction.

**Conclusion**

Condominium reconstruction is complicated due to external influences such as construction agents, reconstruction teams, governmental policies, and internal factors such as residents’ reconstruction preferences, economic capabilities, and characteristics of communities. This is why condominium reconstruction is implemented slowly. In this study, four examples of condominium reconstruction which have shown significant progress are analyzed to investigate factors that influence condominium reconstruction. These factors are listed as follows:

1. Diversification of risk through various types of reconstruction.
2. Importance of resident association regarding reconstruction consensus among residents.
3. Reconstruction through negotiation with construction agents.
4. Professional teams’ support for the promotion of technical reconstruction and verification of information regarding reconstruction.
5. Attracting external parties to assist in reconstruction.
6. Enhancement of communications and negotiation with banks to alleviate financial pressures and reduce difficulty in reconstruction.
7. Improvement of governments’ administrative efficiency and their professional knowledge regarding reconstruction.

Housing reconstruction support program No. 7, which is provided by the 921 Post-quake Reconstruction Foundation makes reconstruction of destoryed condominiums through the urban regeneration program the more preferred option recently. However, consideration should be given to the question; “Is professional experience enough for the implementation of urban regeneration?” At the same time, because 25% of residents give up on same-site, same-scale reconstruction, is it possible for the 921 Post-quake Reconstruction Foundation to participate in co-reconstruction in order to adopt the urban reconstruction plan?

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**Note**

(1) This refers to reconstruction as the completely rebuilding of damaged condominiums.
(2) Post-quake totally destroyed condominium reconstructed according to the original pre-quake plan.
(3) Interior ministry of Executive Yuan comments local governments that over 40 housing-unit damaged condominium should be pointed as reconstruction unit to practice urban regeneration.
(4) According to the contents of an interview with Mr. Liu, Yue-ling who is the chief of the reconstruction committee on June 29, 2001.
(5) The 921 Post-quake Reconstruction Foundation provides a housing reconstruction supporting program including “No. 1: supporting condominiums to undertake urban regeneration”, “No. 2: supporting the repair plan fee for condominiums”, “No. 3: supporting housing reconstruction for low-income families”, “No. 4: supporting local governments to build low-cost housing”, “No. 5: supporting designing or planning fees for housing reconstruction”, “No. 6: supporting guarantee for low-income family or urban-regeneration committees”, and “No. 7: participating in reconstruction with residents who rebuild condominium by the urban regeneration plan”. The contents in No. 7 are: if there are over 75% of residents agree to rebuild a condominium by using the urban regeneration plan, then the 921 Post-quake Reconstruction Foundation can accept application to participate reconstruction with residents.
(6) According to the contents of an interview with Mr. Wang, Chang-hsian who is the chief of the reconstruction committee on June 30, 2001.
(7) According to the contents of an interview with Mr. Wang, Chang-hsian who is the chief of the reconstruction committee on June 30, 2001.
(8) According to the contents of an interview with Mr. Hong, Chou-yen who is the chief of the reconstruction committee on July 20, 2001.
(9) According to the contents of an interview with Mr. Hong, Chou-yen who is the chief of the reconstruction committee on July 20, 2001.
(10) According to the contents of an interview with Ms. Shun, Shou-
Zu who is the secretary of the reconstruction committee on July 20, 2001.

(11) According to the data from Urban Regeneration R&D Foundation, 53 communities applied for the 921 Post-quake Reconstruction Foundation’s “Housing reconstruction plan No. 7”.

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