

Effectiveness and Limitation of the Mitigated Act on Facilitation of Reconstruction of Condominiums

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ABSTRACT

This is study on the mitigation of partly revised Act on Facilitation of Reconstruction of Condominiums for promoting to rebuild old condominiums which have been designed by old seismic code before 1981. The revision is to rebuild the existing non-confirmed condominiums in form as large as existing. Through four analyses, the effectiveness and limitation of act's mitigation to permit additional height and floor area ratio were clarified as follows; i) applicable ratio to the mitigation was not high, but the mitigation was effective to rebuild condominium as large as before, ii) the effectiveness was considered to be limited strongly by restrictions of north oblique line limit in Height Control District and sun-shadow regulation, iii) to realize promotion of condominiums rebuilding, these restrictions should be considered to mitigate in flexible way while keeping quality of life environment.

1. INTRODUCTION

The rebuilding old buildings are high priority task since the old buildings the building permission of which was applied before June 1st 1981 have been designed by the old seismic code of structure. However, the rebuilding condominiums has not progressed well yet, because the forming of unit owner's agreements to rebuild is usually difficult. The number of rebuilt condominiums in Japan are 232 (as of April 2016), this means only 0.6% of the condominiums designed by old seismic code¹. The fact that 90% of the rebuilt condominiums have made floor area larger than before is worthy of note. Selling the additional floor can reduce owner's economic load for construction. To promote rebuilding old condominiums, in 2014 Japanese government partly revised *Act on Facilitation of Reconstruction of Condominiums* (hereinafter called AFRC) to permit the additional floor area ratio only for rebuilding old condominiums which can satisfy the conditions such as minimum the site area, the front road width and length of site facing to front road. The revision also eases the restriction of absolute height in the Height-Control-Zone (hereinafter call HCZ). But, other restrictions such as sun-shadow regulation are excluded from the mitigation. Condominiums in Japan began to spread rapidly after the enforcement of *Act on Building Ownership, etc.* in 1962. After the drastic urban changes of high economic growth, the building form restrictions has been strengthened due to life environment improvement. Especially, north oblique line limit in HCZ enforced in 1973 and sun-shadow regulation enforced in 1976 are the strongest restrictions which excluded from the mitigation, condominiums built before the strengthening are the probable existing non-conformed buildings. Hence, the effectiveness of AFRC's mitigation is considered to have limitation. Based on the above understandings, this study aims to clarify the effectiveness and limitation of AFRC's mitigation through analyses 1) ~ 4) of samples explained in next chapter.

¹ Web-site of Condominium's Revitalization Council has listed samples of all rebuilt condominiums, and shows detailed building data before and after rebuilding. (<http://m-saisei.info/tatekae/index.html>) According to the research of Tokyo Kantei Co., Ltd., 38,662 condominiums designed by the old seismic code exist in Japan (as of Sept. 2011). (https://www.kantei.ne.jp/report/69TR_zenkoku.pdf)

2. METHOD

The research subjects are the existing old condominiums built until 1981 and located in Minato-ku, Tokyo. According to *Survey Results of Condominiums in Tokyo* (as of August 1st 2011) by Bureau of Urban Development in Tokyo Metropolitan Government, in Minato-ku there are the second most number of existing old condominiums. In addition, the ratio of old condominiums in all condominiums is the highest in Tokyo wards, this means that one of 2.7 condominiums is designed by old seismic code.

2.1 Sample Preparation

Firstly, the samples are collected from the Real Estate Information Network System (hereinafter called REINS) which is online information service only for real estate agents, and big-data of trading history including dwelling of condominium². Through screening, 549 samples in Minato-ku are found. Secondly, the building data, such as number of stories, total floor area and site area, are obtained from copies of real estate register. Thirdly, information of the building restrictions on site, such as use district, building coverage ratio, floor area ratio, north oblique line limit in HCZ, sun-shadow regulation, are obtained from urban planning map in Minato-ku. Fourthly, the front road widths of site which affect reduction of floor area ratio are confirmed on the road ledger maps. AFRC's application defines the minimum front road width. Fifthly, the exclusions of samples are considered. 3 samples on the progressed urban development area are excluded. In addition, 11 samples the floor area of which is more than one million sqm that is maximum defined by AFRC's application are excluded. According to above data collecting, 535 samples are prepared for this study. For analyses material, the list of building data and restrictions on site of samples is compiled.

2.2 Analysis Procedure

Analysis 1) is simple numerical statement of applicable samples which are the existing non-confirmed buildings by the absolute height limit in HCZ and/or restriction of floor area ratio, and which are applicable to AFRC's mitigation. Analysis 2) is a simulation of rebuilding planning according to the design guideline of AFRC's mitigation to clarify the possibility that rebuilt condominium can be as large as existing in exchange of making public open space on the site³. Analysis 3) is also simple numerical statement of samples which are existing non-confirmed form, applicable to AFRC's conditions, and located in the strengthened restrictions area of north oblique line limit in HCZ and/or the sun-shadow regulation. Analysis 4) is one-way ANOVA of the samples the sites of which are in the north oblique line limit in HCZ and the sun-shadow regulation⁴. The criterion variables are the number of stories and floor area, the explanatory variable is building year. The criterion variables are defined as bellow to avoid influence of different Use Districts. The hypothesis is that condominiums probably became smaller after the enforcement of strengthened restrictions. Analysis of the transition of criterion variables before and after the enforcement is considered to clarify that the strengthening limits building form strongly.

Criterion variables of one-way ANOVA

Number of stories: [(Floor ratio / Building coverage ratio) - Existing number of stories]

Floor area: [Maximum floor area ratio – used existing floor area ratio]

² The REINS data used in this study is the history from May 1990 to June 2015.

³ Mitigation of floor area ratio and height limit is allowed in exchange of making public open space. See design guidelines of Minato-ku (<https://www.city.minato.tokyo.jp/mansyontatekae/tatekae.html>).

⁴ One-way ANOVA is done by JMP, SAS Institute Inc.

The results of analyses 1) and 2) are considered to confirm effectiveness of AFRC's mitigation, on the other hand, the results of 3) and 4) are considered to indicate its limitation.

3. RESULTS AND DISCUSSION

The results of analyses are shown bellow (Figure 1).

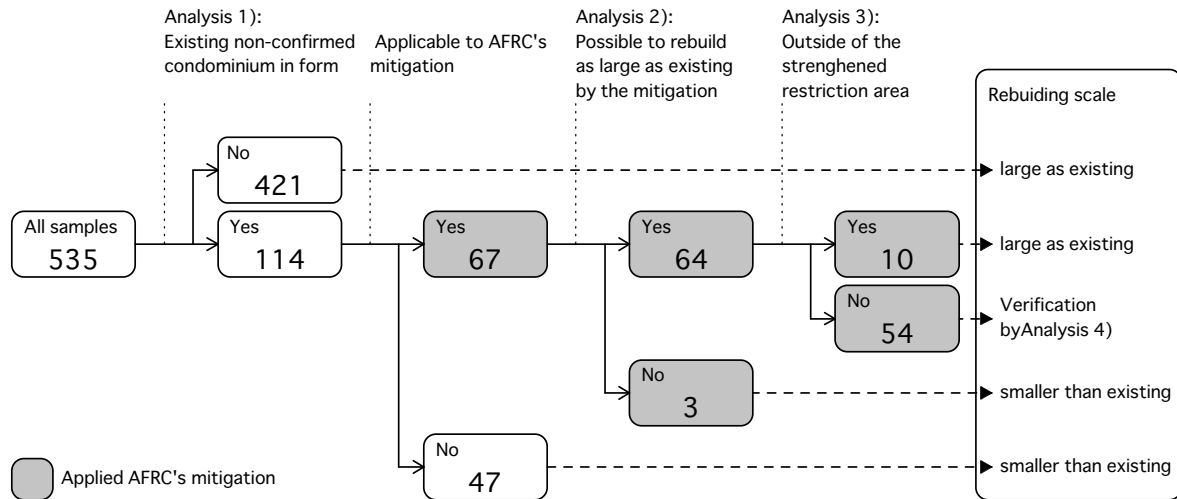


Figure 1: The number of samples through analyses, and possible rebuilding scale

3.1 Results of Analyses 1) and 2): Effectiveness of AFRC's Mitigation.

Results of analysis 1): The number of existing non-confirmed condominiums by the restrictions of height limit in HCZ and/or floor area ratio was 114 samples (21.3% of 535). The number of applicable existing non-confirmed buildings to AFRC's mitigation was 67 samples (58.8% of 114). The reasons why other 47 samples couldn't apply were non-sufficiency of the minimum site area (24 samples), width of front road (22 samples) and length of site facing to front road (1 sample).

Results of analysis 2): As the result of simulation of rebuilding above applicable 67 samples by using AFRC's mitigation, 3 samples became lower than before, but other 64 (95.5% of 67) samples could be rebuilt as large as existing height and floor area.

58.8% application ratio to AFRC's mitigation is not so high. The conditions of minimum site area and width of front road are hard for some condominiums to apply AFRC's mitigation. However, AFRC's mitigation is very effective to rebuild as large as existing.

3.2 Results of Analyses 3) and 4): Limitation of AFRC's Mitigation.

Results of analysis 3): The number of samples of existing non-confirmed buildings, which could rebuild as large as before by using AFRC's mitigation, and which located in the restriction area of north oblique line limit in HCZ and/or the sun-shadow regulation, was 54 samples (84.4% of 64).

Result of analysis 4): The results of one-way ANOVA were shown bellow (Figure 2 and 3). There were significant differences between number of stories and building years, and also between floor area and building year. After around 1974-1975 when the restrictions strengthening had been enforced, the number of stories and floor area started to decreased.

The effectiveness of AFRC's mitigation to rebuild condominiums as large as existing is probably restrictive, since applicable 84.4% (54 of 64) samples to AFRC's mitigation are located in restriction area of north oblique line limit in HCZ and the sun-shadow regulation. If the strengthened restrictions rejected any additional height and floor area for rebuilding, the success ratio to rebuild condominiums as large as existing were only 8.8% (10 of 114).

To promote rebuilding of condominiums, the mitigation of north oblique line limit in HCZ and the sun-shadow regulation should be considered in flexible way while keeping good life environment.

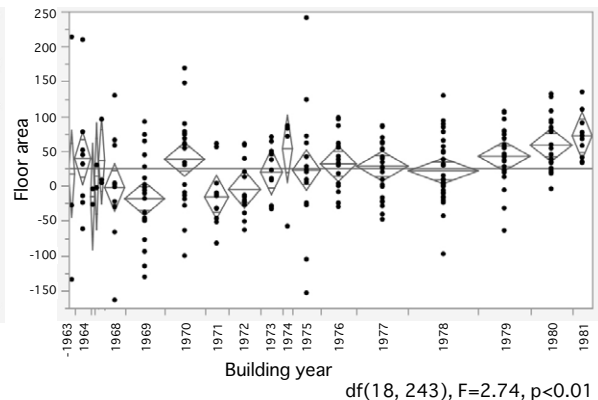
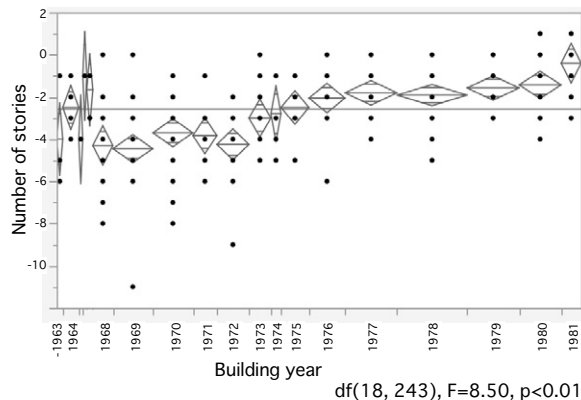


Figure 2: one-way ANOVA of number of stories by building year Figure 3: one-way ANOVA of floor area by building year

4. CONCLUSIONS

This study clarified the effectiveness and limitation of AFRC's mitigation to rebuild condominiums as large as existing through four analyses. Conclusions are as follows,

- i) The application ratio of AFRC's mitigation to existing non-confirmed samples is 58.8% which is not so high. However, the mitigation is very effective to rebuild existing non-confirmed condominiums as large as existing.
- ii) The effectiveness of AFRC's mitigation to rebuild condominiums as large as existing is probably restrictive, since a lot of old condominiums are located in the strengthened restrictions area of north oblique line limit in HCZ and the sun-shadow regulation.
- iii) To promote rebuilding of condominiums, the mitigation of the strengthened restrictions should be considered in flexible way while keeping good life environment.

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