Advanced Materials Research *Online: 2012-05-14*
ISSN: 1662-8985, Vols. 524-527, pp 2680-2683
doi:10.4028/www.scientific.net/AMR.524-527.2680

Risk assessment of city village reconstruction demolition engineering in Urban sustainable development

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Keywords: Urban sustainable development; City village reconstruction; risk assessment of demolition and response; fuzzy comprehensive evaluation; system-level analysis

Abstract. In the past decade, China's urbanization speed was very quick, many villages in suburb have became city villages. City villages are dirty, chaotic, poor and without reasonable planning and design, this has became a serious problem which constraints of city sustainable development. This paper take Xi'an city village reconstruction demolition engineering projects as the main object of study, use the method of fuzzy comprehensive evaluation combined with system-level analysis in demolition of city village reconstruction project for quantitative risk assessment, identify the key risk factors, and measures proposed for the development enterprises to reduce project risks and promote the sustainable development of the city.

Introduction

Due to historical reasons, Xi'an is one of the cities which have more city villages in China. Xi'an has 6districts and 4 zones total 624 city villages , about 0.37 million population. with all kinds of land 0.216 million mu. At the end of 2010, 120 city villages have been demolished in Xi'an, 0.1452 million people have been resettlement. In this process, risk assessment to the demolition of city reconstruction is necessary to urban sustainable development.

City villages were former in the process of urbanization, they have the common problems of building density, weak infrastructure, dirty, chaotic, poor, especially problems of seismic, fire, security. These restrict play of city functions and urban space allocation of resources. After several years of exploration, The work of develop enterprise mainly involves get government approval, get the support of the villagers for the demolition, ensure the removal of funds in place in time , Investigation and statistics the housing and population status of the village survey, sign resettlement compensation agreement with the villagers and so on. Because city reconstruction project involves the demolition compensation and resettlement of the villagers, the develop enterprises are relatively low profit margins, therefore, reduce risk and increase profits. then can we do good projects, people get good apartments, to promote the urban sustainable development.

The risk of construction projects throughout the entire process of the project, to the city reconstruction project, without a good deal of risk analysis and response in the demolition phase may result in the entire project cycle of human, material and financial resources waste and investment efficiency Decline. Therefore, evaluate the risk in city village reconstruction demolition engineering project and take effective measures to deal with the risk is necessary to the entire cycle risk control.

Fuzzy comprehensive evaluation of the city village reconstruction demolition project

Construct a hierarchical structure of risk factors. After a detailed analysis of city village reconstruction demolition project risk factors, and consulted experts of development enterprise which is carrying out city village reconstruction project, this paper puts forward four main risk factors in city village reconstruction demolition project: compensation risk; preparation phase risk; investigation& statistical risk; other risks. Compensation risk including attachment compensation risk, land compensation risk, building placement compensation risk. Attachment compensation risk refers to shops and utilities compensation cost rising. Land compensation risk refers to the fluctuation of the

land cost, Building placement compensation risk refers to the cost rising by resettlement of compensation for the villagers houses. Preparation phase risk including government approval risk, policy risk, and villagers' reform desire risk. Government approval risk refers to the risk of government time. Policy risk refers to the risk of demolition policies change. Villagers' reform desire risk refers to the risk of villagers support degree. Investigation& statistical risk including homestead card statistical risk, houses area statistical risk, household register population statistical risk. Homestead card statistical risk refers to the homestead card load area and actual area inconsistencies lead to increased risk of demolition. Houses area statistical risk refers to the risk of villagers stamped. Household register population statistical risk refers to misstated and fraudulently register population because different compensation standards. Others risks including accident risk, natural risk, capital risk. Accident risk refers to the risk of dismantlement accident. Natural risk refers to the soil condition, geography position risk. Capital risk refers to development enterprise money supply risk. Hierarchical structure of risk factors as shown in figure 1 below.

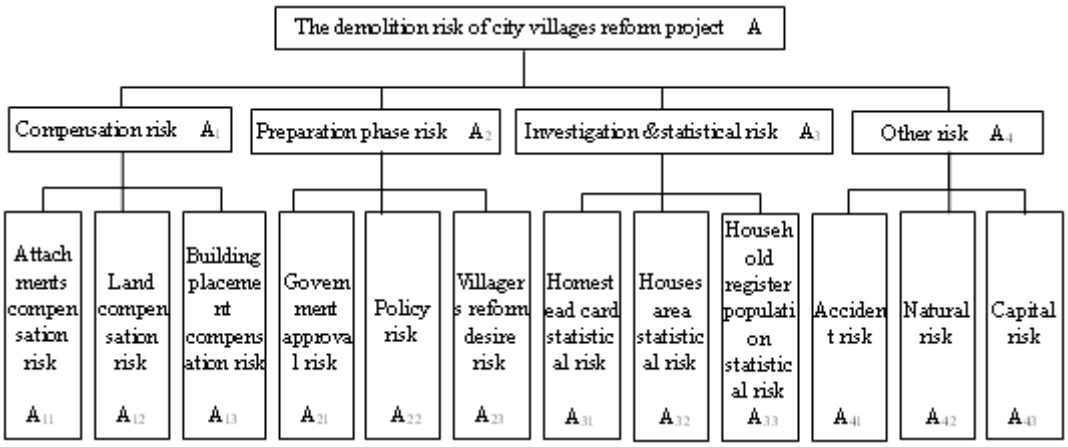

Figure 1 Hierarchical structure of risk factors

Model of Fuzzy comprehensive evaluation of the city village reconstruction demolition project. Fuzzy Comprehensive Evaluation of the city village reconstruction demolition project is a of two Stage fuzzy comprehensive evaluation problem, the key lies in construct at two levels of evaluation matrix, determine the weight and choice of evaluation function. This paper use function (1) as the evaluation function.

$$f = \sum_{i=1}^{n} a_i z_i \tag{1}$$

Construct first stage evaluation matrix. Because risk factors of city reconstruction demolition project can not be directly quantified qualitative indicators, the current treatment methods are commonly used in AHP method, Delphi method and fuzzy comprehensive evaluation method. This paper use fuzzy comprehensive evaluation method for risk assessment. Comment set X = {smaller, small, general, large, great}. First construct the first stage evaluation matrix, construct evaluation matrix respectively of compensation risk, preparation phase risk, investigation& statistical risk, other risks. This paper use expert scoring method to construct the evaluation matrix, select four experts in real estate development and management, four manager of development enterprises, two officers in Xian city village reconstruction office total 10 professionals scoring non-secret. For example, attachment compensation risk which is beyond to Compensation risk, 6 professionals think that the risk is smaller, 2 professionals think that the risk is small, 2 professionals think that the risk is general, the result of scoring in attachment compensation risk is [0.6,0.2,0.2,0,0].Construct the first stage evaluation matrix R_i (i=1,2,3,4)in this method .It's shown in table 1.

Table 1.First stage evaluation matrix

	smaller	small	general	large	great
A_{11}	0.6	0.2	0.2	0	0
A_{12}	0.1	0.2	0.5	0.2	0
A_{13}	0	0.2	0.1	0.3	0.4

	smaller	small	general	large	great
A_{21}	0	0.3	0.5	0.2	0
A_{22}	0	0.2	0.3	0.5	0
A_{23}	0.1	0.1	0.3	0.3	0.2

	smaller	small	general	large	great
A_{31}	0	0	0.4	0.4	0.2
A_{32}	0	0.5	0.3	0.2	0
A_{33}	0	0	0.2	0.4	0.4

	smaller	small	general	large	great
A_{41}	0.6	0.4	0	0	0
A_{42}	0.4	0.5	0.1	0	0
A_{43}	0	0	0	0.7	0.3

Determine the weight fuzzy comprehensive evaluation. This paper use AHP method to determine the weight fuzzy comprehensive evaluation. First establish the comparison matrix of each class, select two experts and two project managers determine relative importance of each risk factor respectively and averaged. Construct comparison matrixes and normalized, then get W_i^0 .After get W_i^0 do consistency test, C. R. <1 marked pass the consistency test. Use W_i^0 (i = 0, 1, 2, 3, 4) as the weight of fuzzy comprehensive evaluation. It's shown in table 2.

Table 2 .AHP method for calculation of W_i^0 and consistency test result

A	A_1	A_2	A_3	A_4	W_0^0	C.R.
A_1	1	1/5	1/2	5	0.14	0.086
A_2	5	1	4	7	0.59	0.086<0.1
A_3	2	1/4	1	6	0.22	
A_4	1/5	1/7	1/6	1	0.05	

A_1	A_{11}	A_{12}	A_{13}	W_1^0	C.R.
A_{11}	1	1/3	1/5	0.10	0.074
A_{12}	3	1	1/4	0.23	0.074<0.1
A_{13}	5	4	1	0.67	

A_2	A_{21}	A_{22}	A_{23}	W_2^0	C.R.
A_{21}	1	1/3	1/8	0.08	0.016
A_{22}	3	1	1/4	0.20	0.016<0.1
A_{23}	8	4	1	0.72	

A_3	A_{31}	A_{32}	A_{33}	W_3^0	C.R.
A_{31}	1	3	1/3	0.27	0.063
A_{32}	1/3	1	1/4	0.12	0.063<0.1
A_{33}	3	4	1	0.61	

A_4	A_{41}	A_{42}	A_{43}	W_4^0	C.R.
A_{41}	1	1/4	1/9	0.06	0.061
A_{42}	4	1	1/5	0.20	0.061<0.1
A_{43}	9	5	1	0.74	

Construct second stage evaluation matrix. Second stage evaluation matrix need to construct judgment matrix with factor sets including compensation risk, preparation phase risk, investigation& statistical risk, other risks. Use function (2) get the result of first stage fuzzy comprehensive evaluation result Q_i(i=1，2，3，4).

$$f = W_i^0 \times R_i \ (i=1，2，3，4) \tag{2}$$

According to Q_i Construct comparison matrix R_0, use W_0^0 as the weight of fuzzy second stage comprehensive evaluation. It's shown in table 3.

Table 3.Second Stage evaluation matrix

Q_1	0.083	0.200	0.202	0.247	0.268
Q_2	0.072	0.136	0.316	0.332	0.144
Q_3	0.000	0.060	0.266	0.376	0.298
Q_4	0.116	0.124	0.020	0.518	0.222

Model calculation and analysis. Use function (2) get the result of second stage comprehensive evaluation, $Y= W_0^0 R_0$.Use function (3)

$$f=\bigvee_{i=1}^{5} Y_i \ (i=1,2,3,4,5) \tag{3}$$

Corresponding comments set can determine the risk level of city village reconstruction demolition project. The result of calculation is Y=(0.06,0.128,0.274,0.339,0.199) , 0.06∨0.128∨0.274∨0.339∨0.199=0.339.According to the above result, we can see that the risk of city village reconstruction demolition project is large, the main risk factors which lead to this result are villagers' reform desire risk, building placement compensation risk, household register population statistical risk, and capital risk.

Conclusions

City village reconstruction demolition engineering project risk response measures.

(1) City village reconstruction office needs to resolutely implement the policy of government leading, introducing high quality development enterprise. Development enterprise needs to communicate with villagers positively, keep promise, providing more security to villagers, getting the support from villagers.

(2)Building placement compensation face the risk of house placement area and house compensation price. When statistic the houses area, development enterprise needs to in-depth statistical area, hold principles, make sure the data is veracity. In compensation, development enterprise needs to survey the local city village reconstruction market compensation price and compensation standards required by the government. At the same time, the development enterprise should hold the principle; deal with the phenomenon of villagers' wild speculation.

(3)The household register population statistics. In strict accordance with the police bureau of evidence to determine the villagers population, city population, needing district offices provide households population economic analysis list; minimize the temporary census register properties change phenomenon.

(4)Capital risk. In view of city village demolition project have more risk factors, cost control more difficult, suggest development enterprise do the preparatory work seriously, control the cost of every link , expand the financing channels, ensure sufficient funds for demolish.

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