



REVIEW

Research on the Factors Influencing the Premium Rate of the Inherent Defects Insurance

Lihua Wang* Shuguang Zhou Yuetong Hui

Logistics University of People's Armed Police Force, Tianjin, 300300, China

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ABSTRACT

This paper introduces the composition of the premium rate of Inherent Defects Insurance, and analyzes the factors influencing the premium rate of the Inherent Defects Insurance.

1. Introduction

In 2004, in order to solve the potential defects of construction quality caused by the rapid development of the construction industry, the Chinese government began to study the Inherent Defects Insurance (IDI) system, and issued many documents to implement in recent years. However, in China, the development of IDI has been restricted by the small proportion of insurance, the small social impact and the low degree of recognition of all parties. There are many reasons for this phenomenon. It is an important problem that the premium rate is difficult to be determined scientifically.

Premium rate is of great significance for the implementation of iodizing the process of implementing IDI, due to the lack of uniform standards, there are often problems that different insurance companies determine different

rates for the same project. The high premium rate results in the low enthusiasm of the policyholder, and the low premium rate results in the loss of the insurance company, which is unwilling to underwrite. Therefore, scientific and reasonable premium rate is of great significance for the implementation of IDI.

2. Definition

Premium: Insurance cost refers to the total monetary expenditure of production factors consumed by insurance companies to provide insurance products. The cost of insurance plus the appropriate management fee, profit, tax and so on constitute the premium, which is usually reflected by the premium rate.

Premium rate: The premium rate refers to the proportion of the expenses paid by the applicant to the insurance company for purchasing the insurance and the insured

*Corresponding Author:

Lihua Wang,

Logistics University of People's Armed Police Force, Tianjin, 300162, China;

E-mail: 3170939995@qq.com.

amount. The insured amount refers to the maximum amount of compensation for the project within the contracted scope by the insurance company. The insured amount is the calculation basis for the insurance company to collect the premium.

3. Composition of Premium Rate

Premium rate includes pure insurance rate and additional rate ^[1].

Pure premium rate is the main component of premium rate, which is determined according to loss probability and loss value.

The premium calculated from the pure premium rate is called the pure premium, which is used to compensate and pay the insurance beneficiary when the events within the insurance scope occur, which is equivalent to the cost of the insurance product.

The additional rate is a secondary component of the insurance rate, including the charge additional rate and the security additional rate. The premium calculated from the charge additional rate is called cost surcharges, which is used for the management expenses, profits and taxes of the insurance company.

The premium calculated by the security additional rate is called the safety surcharge, which is used to reduce the risk of both parties. If the risk is too large in a certain period of time, which exceeds the insurance company's compensation ability and affects the normal operation of both parties, the safety surcharges can reduce the financial risk of the insurance company to a certain extent ^[2].

4. Principle of premium rate determination

In order to determine the insurance rate scientifically, the following principles should be observed.

4.1 Mathematical Principle

According to the large number theorem and the central limit theorem, the insurance rate of IDI should be equal to the average annual risk loss rate of this kind of project in theory.

4.2 Principle of Giving Consideration to Both Sides

Insurance companies should operate normally, and premium is the main source of income. Premium, in addition to paying compensation when the risk occurs to make up for the loss, must also pay the daily management expenses and other expenses of the insurance company. Too high premium rate of IDI will increase the economic pressure

of policyholders, affect the enthusiasm of insurance, and is not conducive to the development of IDI market; too low premium rate will increase the underwriting pressure of insurance companies, and also affect the financial revenue and expenditure of insurance companies, resulting in company turbulence.

4.3 Principle of Justice and Equity

The so-called fair and reasonable is not the so-called absolute average. The insurance rate should be adjusted in time according to the change of risk. The principle of fairness and reasonableness includes two meanings: the fairness between the insurer and the policyholder and the fairness between different policyholders.

The fairness between the insurer and the policyholder means that the premium charged by the insurer should match the risks it underwrites, and the premium paid by the policyholder should match the guarantee obtained by the beneficiary. The fairness between different policyholders refers to the different premiums that should be paid for the insurance subject with different risk levels.

4.4 Principle of Relative Stability

The relative stability of premium rate includes stability and adjustability.

The stability is mainly for the policyholder, which is convenient for the policyholder to estimate the expenditure. Frequent changes in the premium rate will lead to dissatisfaction and affect the policyholder's determination.

Adjustability refers to the fact that the insurance rate needs to be adjusted according to the continuous improvement of statistical data, changes in risk loss and changes in relevant policies and regulations. The premium rate shall be adjusted according to various influencing factors, and the change of future situation shall be estimated to reserve the advance.

4.5 Principle of Legality

The premium of IDI shall be determined in accordance with relevant national laws and regulations.

4.6 Principles of Promoting Disaster Prevention and Loss Prevention

The most important social function of insurance is disaster prevention and loss prevention. Insurance companies should promote the initiative of policy holders through relevant mechanisms to reduce accidents. So, reduce the compensation of insurance companies and the loss of social wealth. For example, the setup of deductible and floating rate follow this principle. Before 1996, there was

no deductible in French housing damage insurance and it was charged at a fixed rate. No matter how small the accident of the subject matter of insurance is, the beneficiary will claim for compensation, the rate of claim remains high, and the false claim is also emerging, forming a "claim culture". After 1996, France began to set up the deductible and adopt the floating rate to give preferential rate to the enterprises with good performance and reputation, which improved the loss prevention awareness of all participants in the project, improved the quality of the project and saved the social cost.

IDI is only a guarantee, and the purpose of insurance is not to compensate, but to urge relevant units to improve the quality of the project and prevent disasters and losses.

5. Factors Influencing the Premium Rate of the Inherent Defects Insurance

Premium rate includes pure insurance rate and additional rate. Then, we study the influencing factors of the two.

5.1 Analysis of the Factors Affecting the Pure Insurance Rate

At present, China adopts the way of differential floating premium. The premium rate is affected by many factors. This paper mainly analyzes the influencing factors of the rate from three aspects: project and insurance, the participants of the project and the quality of the project completion acceptance.

5.1.1 Project and Insurance

The project and insurance mainly includes five aspects: Project soil type, structure type, insurance coverage, historical claim and insurance period.

(1) Chinese buildings are mostly reinforced concrete structures, and the corrosion degree of reinforced concrete is different in different soil. According to the data of China Academy of Building Sciences, the soil in China is mainly divided into four categories: medium alkaline soil, acid soil, inland saline soil and coastal saline soil^[3].

Medium alkaline soil is mainly distributed in the Central Plains, North China and Northeast China, with pH value of 7.0-8.5. After 40 years of burial in such soil, the ordinary concrete materials are basically not rusted, and the compressive strength increases by 70% - 138%. This type of soil causes dissolution corrosion to materials, which belongs to weak or medium corrosion soil.

Acid soil is distributed in the soil of brick red, red, red and loess, with pH value of 4.0-6.5. After 40 years of burying in this kind of soil, the compressive strength of ordinary concrete materials increases by 40% - 80%. Soil

causes decomposition corrosion to concrete, which belongs to medium corrosion soil.

Inland saline soil is mainly distributed in Xinjiang, Qinghai, Gansu and Inner Mongolia, with pH value of 8.0-9.5. After 40 years of burying in this kind of soil, the compressive strength of ordinary concrete materials is reduced by 40% - 100%. This kind of soil causes expansive corrosion to concrete, which belongs to strong corrosion or extremely strong corrosion soil.

Coastal saline soil is mainly distributed in coastal areas, with pH value of 7.5-8.5. After 8 years of burying in this kind of soil, the ordinary concrete material has been destroyed. This kind of soil causes expansive corrosion to concrete, which belongs to extremely strong corrosion soil.

(2) The main insured IDI is residential project, and its structural type includes structural form and floor height.

The structure forms mainly include brick concrete structure, frame structure, shear wall structure, frame-shear wall structure, and frame-core tube structure. According to the order of structural reliability, the most reliable one is frame-core tube structure, and the next is shear wall structure, frame-shear wall structure, frame structure and brick concrete structure. The brick concrete structure is seldom used at present because of its poor reliability. The floor height is mainly divided into four categories: 1-3 floors are low-rise residential buildings, 4-6 floors are multi-story residential buildings, 7-9 floors are medium and high-rise residential buildings, and more than 10 floors are high-rise residential buildings. Different floor heights correspond to different structural forms, which will not be described here.

(3) Historical claims

The higher the historical claim rate and claim amount of this type of project, the greater the risk of the subject matter of insurance. Through the statistics of historical claim data, we can get the average rate of this kind of insurance, but the time of developing IDI in China is limited and the accumulated data is insufficient, so we need to use other methods to assist the research.

(4) Insurance period

The insurance period of IDI varies from one year, three years, five years and ten years in different countries, with different insurance periods and different rates. The occurrence of quality risk is cyclical, and the rate cannot be determined simply according to the shorter the underwriting time and the lower the rate. The risk of some projects occurs within 3-5 years after the completion of the project, and will not occur within 1 year. For this part of the project, the rates of three years and five years are not much different.

(5) Insurance coverage

Different insurance coverage, insurance companies bear different risks, their rates are also different. For example, the rate of underwriting foundation engineering is higher than that of underwriting seepage prevention engineering.

5.1.2 Comprehensive Strength of Project Participants

People are the direct participants of the project and have an important impact on the quality of the project. The pure insurance rate is mainly affected by the insurance cost, that is, by the project quality. The quality control system of IDI mainly includes the contract issuing unit, survey and design unit, contracting unit, supervision unit, TIS and insurance company.

(1) Contracting unit

The contractor is responsible for the construction of the project, is the most direct participant in the project quality control, and has the most direct impact on the project quality. According to the survey, the impact of the contractor on the IDI rate is mainly reflected in the following aspects: enterprise qualification, financial status, Project Awards.

The enterprise qualification of the project contractor is divided into four levels: super level, first level, second level and third level. The super level is the highest qualification. The higher the qualification is, the higher the requirements for the level of the enterprise's employees are, the richer the experience of risk management and control, and the stronger the ability of quality risk control.

The financial situation can reflect the management ability of the enterprise from the side, and then reflect the employee mobility, loyalty and dedication, and then reflect the project quality.

The Project Awards reflect the construction ability of the contractor. China's construction engineering quality awards include three levels: national level, provincial level and municipal level. Each award has strict requirements for the declared engineering quality. The higher the award level, the higher the quality requirements, reflecting the stronger the company's construction capacity.

(2) Contract issuing unit

The contract issuing unit is the manager and controller of the project and is responsible for insuring IDI for the project. The impact of the contract issuing unit on the IDI rate is mainly reflected in the following aspects: enterprise qualification and financial status.

The enterprise qualification of the contract issuing unit is divided into five levels: Level I, level II, level III, level IV and provisional. Level I is the highest level. The higher

the qualification is, the higher the professional quality of employees is, and the stronger the ability to control potential risks is.

The financial situation will affect the payment of project funds. If the cooperation with other units is affected due to the payment of project funds, the project quality and progress will be affected.

(3) Reconnoitering and designing work unit

The survey and design unit is responsible for the structural and architectural design of the project, which is the direct basis for construction and plays a decisive role in the project quality. The influence of survey and design units on the IDI rate is mainly reflected in the following aspects: enterprise qualification, financial status, Project Awards.

The enterprise qualification of survey and design units is divided into three levels: Class A, class B and class C. Class A is the highest qualification. The higher the qualification is, the higher the design level of the enterprise staff is, the richer the design experience is, and the stronger the ability to control the potential risk is.

The financial situation can reflect the management ability of the enterprise from the side, and then reflect the dedication of the staff, and affect the potential risks of the project.

The Project Awards reflect the design ability of the design unit. The higher the award level, the stronger the design ability and the lower the potential risk.

(4) Supervision unit

The supervision unit is entrusted by the contract issuing unit to control the construction quality and safety and improve the construction efficiency and level. But the quality of the supervision industry is worrying. It is blinder to follow the project than to supervise the project. In view of the lack of financial data of the supervision unit, the impact of the supervision unit on the IDI rate is mainly reflected in the following aspects: enterprise qualification and Project Award.

The enterprise qualification of the supervision unit is divided into four levels: comprehensive, class A, class B and class C. Comprehensive is the highest qualification. The higher the qualification, the stronger the risk control ability.

The Project Awards reflect the supervision ability of the supervision unit. The higher the award level, the stronger the comprehensive ability of the enterprise and the more accurate the risk control.

(5) TIS

TIS is entrusted by the insurance company to assist the insurance company in the quality risk control of the project, which is highly professional. However, due to the

shortage of talents in China, the professionalism and scale of TIS need to be strengthened. As insurance companies need to refer to the risk assessment report to determine the rate, the level of TIS will directly affect the determination of the rate.

5.1.3 The Quality of the Project Completion Acceptance

The scope covered by IDI mainly covers foundation works and main structure works. In the process of project acceptance, we mainly rely on four aspects of performance test, quality record, allowable deviation and appearance quality to judge the construction quality, and then determine the premium rate of IDI.

(1) Performance testing

Performance testing mainly tests the indicators of the project through automation and other testing tools. Among them, the foundation engineering mainly tests the bearing capacity of the foundation, the bearing capacity of the single pile foundation and the quality inspection of the pile body, the underground leakage inspection and the foundation settlement observation.

The main structure engineering includes concrete structure and masonry structure. The performance test of concrete structure includes concrete strength, thickness of reinforcement protective layer, position and size deviation. The performance test of masonry structure includes mortar strength, concrete strength and verticality of full height masonry.

(2) Quality record

Quality records include material certificate, mobilization acceptance record and retest report, construction record and construction test.

(3) Allowable deviation

In the construction design, the location information of each component is strictly calculated to minimize the quality risk. In actual construction, due to the difference of construction technology and technical level of construction personnel, the construction location will deviate from the design. When the deviation exceeds a certain limit, it will affect the safety of the building.

(4) Appearance quality

The appearance quality directly reflects the external quality of the project, and sometimes reflects the structural

quality of the project. Common appearance quality problems include honeycomb, exposed reinforcement, holes, slag inclusion, etc.

5.2 Analysis of the Factors Influencing the Additional Rate

The additional rate consists of charge additional rate and security additional rate. The charge additional rate is mainly related to the management expenses, profits, taxes of the insurance company. Security additional rate are set up to cope with the excessive risk of the insured project. It can be analyzed from the perspective of insurer and society.

From the perspective of the insurer, the better the operating efficiency of the insurer is, the higher the level of capital utilization is. It shows that the insurance company has strong capital accumulation and stable operation. It is conducive to the scientific determination of the rate and the stability of the rate.

From a social perspective, the more suitable the market environment and political environment are for the development of IDI, the more scientific the rate is.

6. Conclusion

This paper mainly studies the factors that affect the premium rate of IDI and provides reference for the determination of premium rate of IDI. Due to the short time of developing IDI in China, it is necessary to conduct in-depth research in order to determine the premium rate scientifically and make IDI work effectively.

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