

# Safety Production Liability Insurance and the Pricing of it

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**Abstract:** *The Communist Party of China has attached great importance to the safe production work since the 18th CPC National Congress and put forward that development must not be at the expense of safety and put forward set up the system of safety production liability insurance. In this background, the text introduce the safety production liability insurance and compare it with mortgage system and injury insurance. I find that we can reduce the burden on enterprise and complement the injury insurance when we use the safety production liability insurance. However there are many irrationality in its pricing. So I make use the method of real option pricing to make sure the rate of safety production liability insurance.*

**Keywords:** Safety production liability insurance, Real option, Option pricing

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## 1. Introduction

According to the statistics, there are 60000 accidents happened in 2016 and the death toll reached 41000 in 2016. So The Opinions on Promoting the Reform and Development of Safe Production issued by the State Council on December 18. The documentation put forward cancel the mortgage of safe production system, and set up the system of safety production liability insurance, and it must be applied to High-risk industry.

Safety liability insurance apply the liability insurance to the safety production, and when the safe accident happens, the victims and their families can get compensation. It is a kind of insurance based on emergency rescue occurred in the accident and treatment costs.

## 2. Safety Production Liability Insurance

### 2.1 The system of safety production liability and the system of mortgage of safe production

We implemented the mortgage of safe production since 2006. The industry of mine, hazardous chemicals and firecrackers need to pay 300 thousand to 2 million deposit in advance according to its scale under the terms of the state regulations. The fund is used to disaster relief and aftermath. But this regulation cause great pressure to enterprise funds and the utilization is very low. So implementing mortgage is not good, and it is difficult to meet the needs of prevent and control the safety production risk. therefore The documentation put forward cancel the mortgage of safe production system, and set up the system of safety production liability insurance in 2016.

Compared with the mortgage of safe production system, the safety production liability insurance ask low payment and reduce the enterprise burden. The government stipulates the lower limit of the insured amount, and the rate is lower than the bank's one year deposit rate. What's more the safety

production liability insurance cover more filed. For example, the insurance for high-risk industries, it can not only cover casualties or lost during production, but also cover the additional medical expenses, the liability of third party and accident and treatment costs.

### 2.2 Safety production liability insurance and work injury insurance

Many people think the safety production liability insurance is the same to work injury insurance, but I don't think so. Safety production liability insurance is the important complement to work injury insurance, and it can help protect the legal rights and interests of employees. The system of work injury insurance is a basic social security. It plays an important role in decentralizing corporate risk and promoting safe production. At the same time, there are many disadvantages of work injury insurance, such as narrow coverage, low payout, small preventive and so on and it is difficult to meet the living security requirements of practitioners. On the other hand, although the Safety Production Act provides that workers who are damaged by production safety accidents have the right to make claims to the company in accordance with the relevant civil law except the social insurance that has been paid for work injury, in practical work, it is difficult for injured employees to ask claim to enterprise, so that employee's claim can't achieve, due to the state did not introduce relevant provisions about compensation standard and implementation measures. Insurance company instead of enterprise compensate to employee injured after implement safety production liability insurance, then the legitimate rights and interests of employees are guaranteed.

It is beneficial to solve the problem of accident compensation and the source of funds for accident relief and rehabilitation due to introduce commercial insurance systems to the field of security. Furthermore, implementing safety production liability insurance can make full use of experience of insurance company at risk assessment and

accident prevention. Enterprise can improve conditions of product and strengthen awareness of risk management. Then we can reduce the number of accidents and the economic losses.

### 3. The pricing of safety production liability insurance

The safety production liability insurance is different from the general commercial insurance. The insured amount and the rate of general commercial insurance are determined by the market. But the government stipulates the lower limit of the insured amount of the safety production liability insurance, and rate are determined by China Safety Regulatory Authority, China Insurance Regulatory Commission and insurance company. They determine the rate based on the local security incidents. According to the market show, the enterprise than did not happen accident last year can get a 5% to 30% discount .But if the enterprise occurred accident at the last three years, it will be punished, such as fine, raise the premium rate 5% to 30%.

Currently, the government stipulates the lower limit of the insured amount of the safety production liability insurance. When they formulate the rate. They only take consideration of the industry risk and the risk of the enterprise itself. It is obvious that the rate made by this way is not match to the risk of business. For example, the enterprise that the number of employees is large need to pay more premium. At the same time, This kind of enterprise usually pay more attention to safety production and invest more capital to safety production. Therefore ,the text fix a price to the rate of the safety production liability insurance from the perspective of real options and take the behavior of buy insurance to real option.

Actually, the real option is an investment chance that compound option characteristics but can not trade in the financial market. The option is valuable because of the possibility. Purchasing insurance can be seen as buy a option. Policy holder pay premium, so when the enterprise have an accident, they can get compensation as well as exercise of rights. When there no accidents, they give up the rights. The premium is the option premium. The relationship between real options and financial options is as follows:

variable	Financial option	Real option
S	Current stock price	Expected asset price
X	execution price	The cost of acquiring the asset in the future
R	risk-free rate	risk-free rate
$\delta$	stock volatility	The assets volatility
D	Stock dividend rate	The cost of maintaining the asset
T	time	time

What the accident happen whether or not to is a kind of qualitative behavior, not quantitative, we can take the volatility of the stock to reflect the impact of the accident on the enterprise. Buying a safety production liability insurance

is same to buying a put for the enterprise. When the stock price fell to a certain share, we think there exist accident, then the enterprise can get the compensation from the insurance company. The enterprise exercises the power. On the contrary, the enterprise give up the right, and loss the option fee.

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