

## Study on Risk Assessment and Management of Oxygenerator Project for H Company

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### Abstract

Industrial gas project develops very quickly, and has the very big market demand. However, the industrial gas project itself has a greater risk, once the risk, not only can not recover the investment, but also bring great economic losses, and the surrounding environment has a certain impact. This needs to carry on the scientific risk assessment to the project, takes the corresponding measure to identify the main risk in the project, thus proposes the risk prevention measure. This paper is based on the specific circumstances of oxygen machine project and gas and industrial investment environment, the main risk of the project of oxygen machine for the identification and evaluation, mainly using the deterministic risk assessment and risk assessment of qualitative and quantitative analysis of two methods.

### Keywords

risk assessment, oxygenerator project, economy, risk management.

### 1. Introduction

Under the new situation of rapid development of the health care industry and energy industry, the demand for industrial gas from all walks of life is also increasing, which greatly fuels the rapid development of China's industrial gas industry. So far as it is concerned, an increasing number of industrial gas projects have been built and put into operation. However, industrial gas projects need not only to be built on a large scale, but also to involve strong professionalism. At the same time, the market demand is also fluctuating fiercely, let alone the need of the projects to be ensured with high safety performance. What is most critical is that it takes a long time to realize the recovery of the investment. Therefore, it is very likely for the presence of many risks to be in the process of production, construction and operation of industrial gas projects. In the case of a risk occurrence, it will not only cause the failure in recovering the investment funds and realizing the gain upon time invested and profits for the project investors, but also may bring serious harm to the society and the environment. The first oxygenerator in H Company's oxygen plant was built and put into operation in 1958. So far as it is concerned, there are seven sets of oxygenerator units installed in H Company's oxygen plant, which were manufactured in France, Japan, China and Germany respectively. Among them, Unit sets 30000 and 35000 are the two most frequently used machine sets, which can be used to in the production and operation of liquid products and gas products, such as krypton, liquid nitrogen, argon neon, xenon, liquid oxygen, nitrogen, helium, liquid argon, oxygen and medical oxygen.

Before 1929, the problem of managing enterprise risk did not attract much the attention of the people[1]. It was not until 1929 that people began to realize the importance of risk management. The concept of the so-called "safety management function" was first put forward in 1916 by Henri Fayol, a French management scientist. Following that, Marshall, a famous scholar, also put forward the view of risk burden management in 1921. In his book titled Enterprise Management, he pointed out two ways to deal with risks, that is, to exclude risks and to transfer

risks. Later on, the American Management Association initiated risk management for the first time in 1931. At the same time, in the following years, it organized research classes, academic conferences as well as in other ways to focus on the risk management issues. In 1963, American economists Mel and Hutchis systematically studied the concept of risk management, and at the same time, formulated the structure of "insurable risk management". Although the risk management of industrial gas projects is internationally attached with high importance[2-4], as far as it is concerned, many project managers in China are still lack of enough knowledge of the risk management of industrial gas projects[5]. With the continuously upgraded market competition, there exist more and more uncertainties, which makes it vulnerable to the increase of risks in industrial gas projects. In this sense, it is necessary to increase the risk management of industrial gas projects.

## 2. Identification of Major Risks in Oxygen Plant Project of H Company

### (1) Production risk

Production risk is one of the main forms of risk in H Company's oxygen plant project. Generally, the oxygenator is composed of system units for cooling, pressurization, expansion and compression. Due to its special structure, the oxygenator operates in the flammable and explosive environment all the time. Strong explosion may happen to the oxygenator under the influence of some adverse factors, which may cause serious damage to the equipment and even casualties. Factors such as instrument failure, equipment failure and operation error may lead to shutdown or even explosion of the oxygen generation equipment.

### (2) Equipment installation risk

The installation procedure of the oxygenator is a complex process involving challenging technical difficulties. Therefore, there is a great risk of equipment installation in the oxygenator project. If the relevant equipment itself has quality defects, such as unreasonable design, poor material of construction, etc., or the site hoisting and assembly planning of the equipment is unreasonable, or errors occur in the process, the installation risk of the equipment will then become high.

### (3) Market risk

Failure of marketability, market changes and other factors will affect the price trend of the products, thus bringing the enterprise with economic losses. The market risk of industrial gas mainly is caused from the upstream gas-user consumption and the supply and demand of the industry. Electronic, petrochemical, metal and glass are the upstream industries that consume industrial gas. The product price and the supply and demand of the upstream gas-user-user industries will have a huge impact on the price of the downstream gas products. It can be claimed that the development of the upstream gas-user industries determines the final price of the downstream gas products. Given the new development situation, the gas industry not only has great development opportunities, but also has high business risks.

### (4) Financial risk

Financial risk is all the risk existing in the investment and financing activities of the enterprise. In a narrow sense, the financial risk of the enterprise generally refers to the financing risk of the enterprise and the variability of the enterprise's profits. Borrowed funds and self-owned funds are the main components of enterprise assets. If an enterprise owes too much debt, its operating capacity will significantly decline. Generally speaking, the earning capacity of an enterprise will be limited to a certain extent. Exchange rate risk and interest rate risk are also common forms of financial risk.

### (5) Risk of project raw material supply

There are many kinds of variable factors in the supply of raw materials for the project. Both the price of materials and the source of supply are variable. The change of the material price and the source of supply will affect the overall cost of the project. H Company is a leader and pioneer in China's steel manufacturing industry, who has strict audit on material manufacturers. However, even so, some suppliers may not be able to provide qualified materials required by relevant projects. Moreover, if there occurs any traffic accident during the transportation of raw materials, the quality of materials will be damaged and may no longer be useable for project construction. If the material transportation is delayed due to the force majeure, the project of oxygenerator of H Company shall have to bear the corresponding risks during the construction period.

### **3. Risk Management Countermeasures for Oxygen Plant Project of H Company**

#### **3.1. Preventive Measures to Counter Risks in Advance——Construction of Risk Management System for Oxygen Plant Project of H Company**

(1) Improve the risk prediction ability of risk managers. Project risk manager refers to the financial personnel and project management personnel (Project Leader). The comprehensive quality of risk managers should be continuously improved, and the members of risk management committee and other risk management functional departments should be trained. It should be noted that there are many methods to analyze and measure the financial risks, which include financial leverage analysis, probability statistical analysis and sensitive analysis.

(2) Optimize and maintain the risk management information system. The optimization and maintenance of risk management information system is of great practical significance. Therefore, it is necessary to arrange experienced and qualified technical personnel to carry out optimization and maintenance of risk management information system on a regular basis, so as to ensure that the information system can work continuously and stably.

(3) Make a scientific plan for project risk management. The management personnel shall carefully analyze the characteristics of various risks in the project, and select appropriate risk disposal methods in combination with the characteristics of risks. Project managers should select risk control methods scientifically and accurately to realize the objective of achieving the maximum effect with minimized cost.

#### **3.2. Countermeasures Against Risks in the Process——Risk Retention**

Risk retention is the main technical measure of risk management in the project of oxygenerator of H Company. Reasonable risk retention measures can effectively protect the benefits of the project and reduce the adverse effects caused by the project risks. Before applying the risk retention measures, we should consider whether the maximum expected loss, the maximum possible loss and the financial resources of the project are suitable in the short term, and whether the financial capacity of the project is sufficient to cope with the maximum consequences caused by the relevant risks. H Company's oxygen plant project shall have sufficient financial preparation to ensure that the operation of the project will not be greatly affected after the loss. If the reserve fund of the project is insufficient when the loss occurs, the future cash flow must be used to make up for the loss.

#### **3.3. Post-event Risk Disposal Measures**

Post-event risk disposal is post event disposal. In the post event risk disposal stage of H Company's oxygen plant project, it is necessary to strengthen the monitoring and control to carry out the most strict and effective control of relevant risks. According to the analysis, the project belongs to the medium risk project. The oxygenerator must be operated in the

inflammable and explosive environment for a long time, and many factors may cause risks. Based on the work experience, the following suggestions are put forward on how to strengthen the post event risk disposal of the oxygenerator project of H Company:

(1) Collect payment by legal means. Financial risk is a risk that is difficult to avoid completely, while H Company's oxygen plant project must face not only domestic financial risk, but also exchange rate risk and interest rate risk in the process of operation. These risks are uncontrollable to some extent. The project leader should do a good job in project interest protection, and pick up legal weapons to protect his own legitimate rights and interests when necessary.

(2) Ensure a good job in the management of accounts receivable. The archives of accounts receivable shall be closely monitored and properly managed. The person in charge of the project must do a good job in perfecting and perfecting the basic data system such as the time of credit sale, the reason and the way of collection. Attention should be paid to the selection of collection strategy and the preparation and analysis of the analysis table of accounts receivable should be strengthened. The person in charge of the project shall notify the customer on regular basis of the remaining term of repayment, with a good job done in credit evaluation and analysis of the customer, to increase the frequency of notifying the customer of repayment by telephone.

(3) Solve the issue of bad debts. A reasonable bad debt provision system should be established to account for the estimated uncollectible accounts receivable, that is, the accounts should be included in the expenses in a timely manner to ensure the existence of the accounts in the financial statements, so as to effectively reduce the losses caused by bad debts and enhance the self-protection ability of the project.

(4) Transfer the risk of the receivables. The project leader shall strengthen the loan financing work and use the receivable accounts as the guarantee of debts in this process. The project leader can transfer the accounts receivable to the financial institution engaged in the purchase of accounts receivable, or transfer the accounts receivable to the bank, so that the accounts receivable risk of the project can be effectively transferred.

#### 4. Conclusion

In this study, the risk assessment of H Company's oxygen plant project is carried out based on the data collected at present, with the conclusions put forward as follows:

Through the research and analysis of H Company's oxygen plant project, it is found that the project has the characteristics of large investment and high risk. The risks faced by the project include financial risks, construction risks and market risks. There are many kinds of risks and potential threats in the oxygen plant project of H Company. Therefore, effective risk control measures must be taken to ensure the normal operation of the project.

Based on the above, the following risk management measures are proposed:

The work of risk disposal is divided into pre-event risk disposal, in-process risk disposal and post event risk disposal respectively which corresponds to the pre-stage of the project, the process of the project and the post-stage of the project. H Company is a well-known iron and steel group, which has a great influence in the industry. The leader of oxygenerator project should ensure a good job in risk prevention and treatment, and fulfill the glorious task given by H Company with high efficiency and high quality. In the future, the industrial gas preparation industry will enter the golden age, the oxygen market is very large, the risk prevention and disposal work of the oxygen plant project indirectly promote the progress of the oxygen plant project, the safety investment of the project funds, the effective control of the market risk and other core work are closely related to the risk disposal work, and ensure a good job of risk analysis for the oxygen plant project and management work to reduce various risks of the project and promote the rapid development of the industrial gas production industry.

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