# Analysis of Accidents Caused by Management Violations

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**Abstract:** Based on the analysis of the violation, it is concluded that people's unprofessional operation directly or indirectly caused to personal injury accident, which account to 80 to 90 percent of the annual total number of accident. The characteristics of the violation is potential, intractable, exclusivity, contagious and latency is expounded. Through the case of administrative violations, explaining the cause of the illegal behavior. The forms of violation are explored. Relevant control measures are formulated. Various kinds of illegal behavior of power grid production is eliminated at maximum. The accident will be reduced, and it has great realistic meanings to the healthy, sustained and steady development of power grid enterprise.

## 1. Introduction

The definition of violation is in the process of electric production activities, in violation of the provisions of national production safety law and discipline of the electric power industry, in violation of the enterprise and the superior department in charge of production safety rules and regulations, anti-accident measures and safety management requirements, etc. The violation may pose a hazard to person, power grid and equipment and easy to cause the lack of accident management. People's unsafe behavior, unsafe state of things and unsafe environmental are the factor.

The security risk coefficient of power grid enterprises is very high. The construction, operation, maintenance and the other production process of power grid is complex. The inherent risk factors is many. The safety management is difficulty. According to the accident statistics report of state grid corporation, people's unprofessional operation directly or indirectly caused to personal injury accident, which account to 80 to 90 percent of the annual total number of accident. The cause of the illegal behavior is analysed and illegal forms is expounded. Relevant control measures is formulated. Various kinds of illegal behavior of power grid production is eliminated at maximum.

## 2. The Characteristic of the Violation

### 2.1 Potential

Theory and practice studies have shown that all the violations are not safe, because the degree of safety, environment, conditions are different, and some people think violation does not necessarily lead to an accident. Habit becomes natural, illegal behavior is accepted in a certain group, its potential, concealment can not be recognized at a glance. The danger is not realized, either the consequences of the violation and its harm. The vigilance to against the violation is lost. [2]

### 2.2 Intractable

Illegal behavior is concerned with personnel's psychological, physiological, education level, temperament, environment and other factors. Once illegal behavior form a habitual, it will be hard to correct. As long as the psychological pattern remains the same, work attitude is constant, habitual way of action is invariable, illegal behavior will occur repeatedly. The illegal intractable is intensified. Unless the illegal personnel suffered accident damage and change its behaviour.

### 2.3 Exclusivity

Illegal operations are generally pass or leave out one or more normal operating procedures, so the operation process is more convenient and labor-saving, etc.

The formal procedure is likely to spend more time, especially some staff with strong operational skills summed up their own procedures. They choose "shortcut" to complete the task. They think it is very practical and convenient, ignoring safety production management system.

### 2.4 Contagious

Due to the characteristics and advantage of violation, it is easy to be accepted by the staff with weak safety consciousness. If the violation is not to be found again and again, and no accidents happened luckily. So people will have fluke mind. The correct operation will be weaken gradually. The illegal work "experience" will be spread. Therefore, the contagious ability of illegal behavior has strong vitality. It will affect one layer to another layer, and cause the consequences of "one continuous line", which is very harmful.

### 2.5 Latency

Violation may lead to the accident directly, and even to be malignant accident. On the other hand, not all violations will be accident. Because a violation is only a necessary condition, not a sufficient and necessary condition.

According to the Heinrich accident rule, only when violations accumulate to a certain number or in a certain environment, it will inevitably lead to accidents. Therefore, the relationship between violations and accidents is direct proportion to a certain number of behavior results, which reflects the latency and complexity of accidents caused by violations.

## 3. Management of violation

Management of violation refers to leaders and managers at all levels do not perform their job safety duties. Safety management requirements are not implemented, safety rules and regulations are not supplemented or enforced, or existing violate regulations and command in the course of production operations. The concrete performance is as follows:

1) The first safety responsible person is not in accordance with provisions of the safety supervision institutions to manage.

2) The first safety responsible person is not in accordance with provisions of the safety analysis meeting to host.

3) The safety production responsibility of personnel at all levels is not clear and carry out.

4) The safety supervision institutions is not set up by rules and security officer is not configured.

5) The measures, plan and funds of the safety production is not carried out by rules.

6) On-site safety protection device, safety instruments and personal protective equipment are not configured by rules.

7) After the equipment change, the corresponding rules, regulations and the information is not updated in time. The main wiring diagram of the site operation is not strictly checked according to the regulations, and the connection line with the on-site equipment is not verified seriously.

8) The on-site regulations are not reviewed, revised and writing to notified the relevant personnel once a year.

9) New production personnel, the level 3 safety education is not organized or employees did not organize the examination of regulations for safe production of electric power.

10) The list of working ticket issuers, working responsible person, working permissive person, and persons who have right to inspect high voltage equipments alone is not published every year.

11) The accident has not been investigated and dealt with the principle of "four no admit".

12) The violation is not stopped or checked.

13) Check out the hidden dangers of safety, but did not make rectification plan to implement the corrective measures.

14) Did not fellow the relevant regulations to design, procurement, construction and inspect, resulting in equipment installation defects

15) Investigation on-site is not according to regulations or there is no investigation record.

16) The arrangement of grid operation mode and the dispatch plan is not implemented.

17) Command against rules or interfere with the operation of duty scheduling.

18) No ticket operation is arranged or acquiesced.

19) Arrange the power supply before the completion of review the condition of the customer receiving electricity project.

20) During large-scale construction or dangerous operation, the management personnel are not at the post.

21) The contractor has not carried out qualification examination or illegal contracting of the project.

22) The contracted project has not signed the safety agreement according to law, and the safety responsibility of both parties is not clear.

## 4. The Case of Administrative Violations

### 4.1 Details of the accident

On April 26th, the Technical Chief of the Oriental Project Department delivered the "installation instructions for rigid beams" to a company and made a technical announcement. On April 30th, according to the arrangement of Dongfang Project, a company hoisted rigid beam. At about 14:00p.m. the vice-captain and technician of a company construction assigned related requirements to working controller and other seven construction staff, and appointed a guardian. About 16:00, a rigid beam assembly with length of 15.2m, height of 8.5m, weight of 18.4 tons was hoisted by the crane under the command of the heavy lifting industry until about 17:00. Five chain gourd hook weight of five tons and two chain gourd hook weight of three tons were used. The chain gourd hook is hung on the upper rigid beam by wire rope, and the rigid beam assembly is hung by wire rope at the lower end. After the hook is connected, the crane is informed of the loose hook, and the rigid beam assembly is suspended by seven chain hoists, ready to be adjusted and in place. After the wire rope is unhooked, the crane is transferred to other work sites.

In the course of hook and position, a total of seven operators stood on the upper rigid beam and pulled the gourd, which was under the unified command of one person. Coordination of hoist lifting steps. During the operation, two people hang seat belts on the upper water wall gourd chain, and five people hang seat belts on the chain gourds lifting rigid beams.

At 19:35, when the rigid beam assembly is adjusted to fit the bolt in position, the upper hook of the first five tons chain hoist on the left side of the rigid beam suddenly breaks, and then the other six hoist chains are broken one by one, causing the rigid beam component to fall down, and the left side of the component first lands on the ground, then vertically inserted into the zero meter ground. As a result of the seatbelt hanging from the chain gourd of the lifting rigid beam assembly, the five people standing on the rigid beam also fell together. Among them, one person fell to zero meter, two person fell on the rigid beam above the leveling device beam, one person fell on the 12.6-meter steel frame beam in front of the furnace and one person fell on the safety net on the front side of the 12.6-meter layer. The two people were suspended by the chain gourd hook. The result is four people were dead, one was seriously injured and two people were slightly injured.

### 4.2 The cause of the accident analysis

The fist cause is the company constructor use five chain gourd hook weight of five tons and two chain gourd hook weight of three tons to lift the 18.4 tons rigid beam assembly is wrong, the method violates the safety working rules of electric power construction.

The total allowable lifting weight of the seven chain hoists exceeds the weight of the sling, but the allowable lifting weight of each chain gourd is much smaller than the weight of the sling. The chain gourd is operated manually by the operators. In the actual operation, the equilibrium force of

each chain gourd can not be accurately controlled. On the unbalanced state, the chain gourd with large force first destroied, then produces a chain reaction, and the other chain gourds break one by one. DL5009.1-2002 “Safety working rules for electric power construction (part of Thermal Power Plant)” clearly stipulates that when two or more chain hoists lift the same weight, the weight of the heavy object shall not be greater than the allowable lifting weight of each chain gourd.

The second cause is the safety awareness of on-site construction personnel is weak, safety protection equipment is used inaccurate. The seatbelts of four dead person were all hung on the chain gourd of the rigid beam assembly. Once the hoist broke, the person fell down with the lifting piece, and the seatbelt did not play a protective role. DL5009.1-2002 “Safety working rules for electric power construction (part of Thermal Power Plant)” clearly stipulates that safety belt must be fastened at the height of the operator. The safety belt should be hung on the strong and reliable place above. According to the operation characteristics at that time, the safety belt or safety rope should be hung on the rigid beam installed on the upper deck.

The third cause is that Dongfang Project Department and Chengda Supervision Company are not strict in the examination of construction technical plan, safety management and supervision are not in place.

## 5. The Causes of Violation

Violation has all sorts of reasons, but generally can be divided into subjective and objective reasons.

### 5.1 The subjective reasons of violation

Violation of subject is the person; the person's wrong ideological understanding is the main source of unsafe behavior. Due to the employee's individual culture level, social experience, family situation, ideological quality, such as each are not identical, the subjective cause of violation is also varied, can be roughly divided into the following twelve, as shown in figure 1.

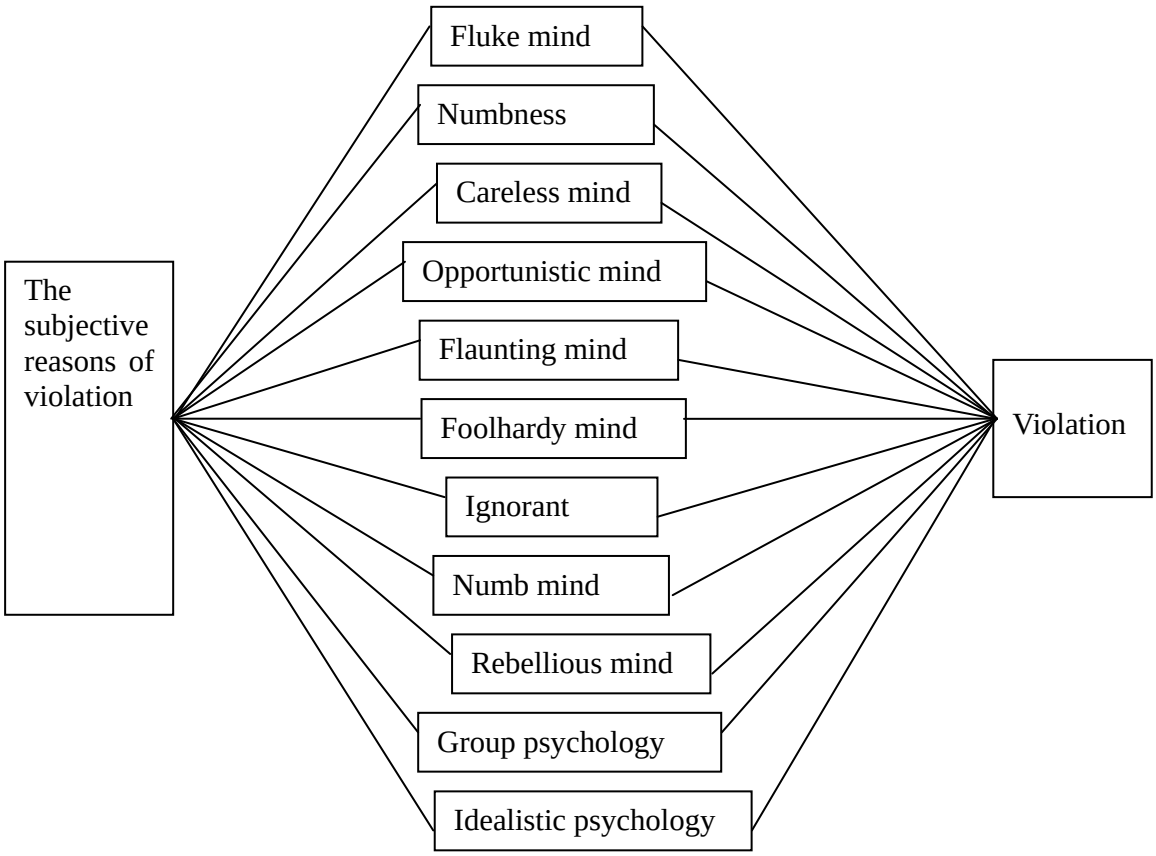


Fig.1 The subjective reasons of violation

### 5.2 The objective reasons of violation

There are four main objective reasons of violation, as shown in figure 2.

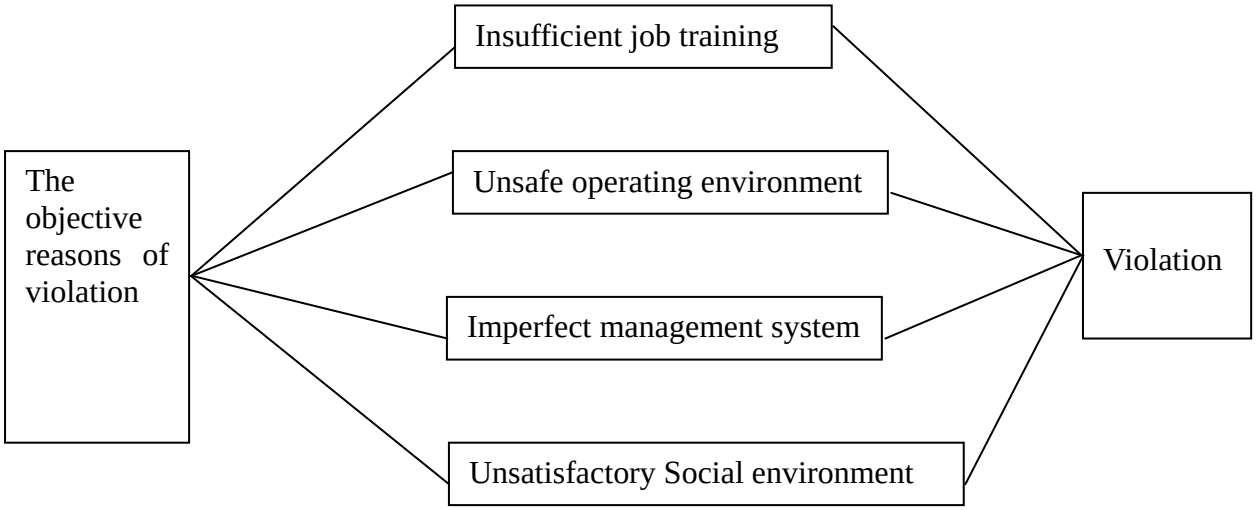


Fig.2 The objective reasons of violation

The causes of violation are analyzed from the subjective and objective aspects. Although there is no corresponding causality between the violation and the accident, violation is the source of accident and violation is the source of casualties. Therefore, analyzing the reason of violation is helpful to eradicate the illegal behavior, to eliminate the breeding soil of illegal existence, and to improve the level of safety in production.

## 6. Conclusions

The lesson of the accident tells us that a person's psychological characteristics are very important, which is direct related to the safety of behavior. Every employee must pay attention to the psychological problems related to safety and take effective measures to improve his ability to control his unsafe behavior psychologically. We should implement the basic principle of "combining investigation and prevention, giving priority to prevention, carrying out responsibilities, and perfecting mechanisms". Adhere to fully rely on the safety assurance system and safety supervision system. Actively carry out self-investigation and self-correction, mutual investigation and mutual rectification. To establish an effective working mechanism to prevent and punish violations of regulations.

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