

산업용 수용가의 정전비용 조사 및 분석

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Investigation and Analysis of Interruption Costs for Industrial Customer

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**Abstract** - As the power industry moves towards open competition, there has been a call for methodology to evaluate power system reliability by using customer interruption costs. This paper presents an evaluation of interruption costs by industrial customer type in Korea using customer survey methodology. When various research results are examined, the customer damage survey methodology becomes much more generalized. Especially, in the case of industrial customers, it is known that the evaluation by customer damage survey is more useful. Accordingly, this paper selected the customer damage survey method to evaluate interruption costs by industrial customer type in Korea considering interruption and customer characteristics.

1. Introduction

When competition is introduced to the power industry, power companies have to consider the market value of their power service, while customers have to consider supply reliability and its cost for the power they purchase since the maintenance of supply reliability costs both the power companies and customers.

In the competitive power market, calculation of interruption cost is very significant as interruption, i.e. supply reliability will be an important factor for decision making for both the supplier and the user. Accordingly, development of a model to assess interruption cost for customers is economical and important as it is one of basic data to ensure fair power transactions in the future.[1]-[3]

Several studies on the interruption cost from power companies perspective have been carried out in Korea but almost no study has been done on the economic cost of power interruption to customers. In recent years, momentary power outages tend to cause more damages to industrial customers than the ones lasting more than 5 minutes, the statistical standard for interruption.

Therefore, it is necessary to develop an interruption cost model by industrial customer type according to power quality including momentary outage to improve power supply environment, which will ultimately improve the international competitiveness of Korean enterprises.

This paper presents an examination of the direct and short/long term interruption costs borne by industrial customer type through a customer damage survey. The questionnaire included interruption characteristics, such as interruption duration, day, time, and month of interruption, whether an advance warning was given or not, as well as customer characteristics, such as business size and type.

2. Evaluation and analysis of the Interruption Costs by Industrial Customer Type

For the assessment and analysis of outage costs for industrial customers, the industrial customers were classified into 11 categories based on the examination of outage costs for industrial customers included in this year's technology development plan as follows: manufacture of food and beverages, manufacture of textiles and apparel, manufacture of pulp and paper products, manufacture of chemicals and chemical products, manufacture of basic/fabricated metal products, manufacture of other machinery and equipment, manufacture of electric and electronic equipment, manufacture of electric machinery, manufacture of audio and visual equipment, manufacture of motor vehicles, and manufacture of other transport equipment.

2.1 Analysis of the survey respondents by industry type

Table 1 shows the customer types for the survey of interruption costs for industrial customers.

<Table 1> Analysis of the respondents by industrial customer type

No	Customer type	Details
1	Food and beverages	Manufacture of food and beverages, processing of meat, fruit, vegetables and grains, manufacture of tobacco products, manufacture of starch and feed products, and processing of fat and oil
2	Textile and apparel	Manufacture of fabric and textile products, sewn articles and apparel, leather goods, yarns, and luggage and footwear, and dyeing
3	Pulp and paper products	Manufacture of pulp and paper products, corrugated cardboard, paper containers, and cardboard
4	Chemical and chemical products	Manufacture of coke and related products, rubber and plastic, compounds and chemical products, and medical product
5	Basic/fabricated metal	Manufacture of basic metal products, basic steel products, basic non-metallic mineral products, fabricated metal products, metal products for structural purposes, and other fabricated metal products, die-casting and metal processing
6	Other machinery and equipment	Manufacture of other machinery and equipment, weaponry, shells and bullets, home machinery, and machine tools for processing
7	Electric and electronic equipment	Manufacture of semi conductors, electric and electronic related components, home appliances, insulations and cables, storage batteries, and bulbs and lighting device
8	Electric machinery	Manufacture of motors, generators, storage batteries, power supply devices, and other electric machinery
9	Audio visual equipment	Manufacture of audio, visual, and communication equipment and broadcasting equipment
10	Motor vehicles	Manufacture of automobiles and trailers and engine, body, and automobile part
11	Other transport equipment	Manufacture of freight transportation and other transportation equipment

2.2 Analysis of the worst period for interruption

■ Analysis of the worst period for interruption(by month)

Survey subjects were asked about the worst month for interruption. Most of the respondents (80%), except those in textiles and apparel category and pulp and paper products category, answered that there was no worst period for interruption. The highest percentage, 67.7% answered that all the months were the same and 9.2% and 8.2% answered the worst months were summer months, July and August, respectively. By industry type, August was considered the worst month for interruption by the respondents in food and beverage, textiles and apparel, and pulp and paper products categories more often than those in other categories. Fig.1 below shows the worst month for interruption by industrial customer type.

■ Analysis of the worst period for interruption(by day of the week)

Survey subjects were asked about the worst day of the week for interruption. The highest percentage, 8.6% answered Monday was the worst. Except for Monday and Sunday, the remaining 5 days elicited almost the same percentage of response of 5%, which means there is not much difference between days of the week. Especially, differences between days of the week were smaller for food and beverages, basic/fabricated metal, and other transport equipment categories than other categories. In addition, the highest percentage, 35.8% answered that when an interruption occurred, the loss was about the same for all days of the week. Of the weekdays, Monday was most frequently mentioned as the worst

