

Social and Business Risk Management

– Contributing to More Comfortable and Safer Communities –

Brief Overview

We integrally promoted researches related to the natural disaster risk and human risk to ensure safety and security to the power generating facilities, and those related to energy policies.

For natural disaster risks, we officially started site observation for snow damage measures research in the power transmission facilities and succeeded in observation of weather conditions, snow covering situation as well as galloping behavior at electric wires to obtain variable data for countermeasure study. For power distribution facilities damaged due to earthquake, etc. we developed restoration supporting systems including a real time damage estimation system for effective recovering operation estimating damages on a real-time basis and a part of the systems is demonstrated by test operation.

To respond new guidelines of seismic design of nuclear power plants, we proposed assessment method of earthquake scale from active faults by combining optimally topographical, geological, and geophysical methods depending on target areas to reflect results to seismic safety assessment of existing power plants.

For energy policies, we studied electrification scenario concentrating to energy saving, promotion of electrification, and low carbon emission power sources for realization of low carbon society to propose as one of the effective solutions for global environmental problems.

Achievements by Research Theme

Risk management of electric power infrastructure (natural disaster risk)

- Earthquake scale assessment by active fault survey
 - Proposed a seismic scale assessment method and its detailed step combining optimally topographical, geological, and geophysical methods. [N08028; N08035; N08038; N08039]
- Wind and snow disaster prevention assessment of electric power facilities
 - Started officially field observation on snow damage at the power transmission facility to achieve observation of digital dynamic image to the wire galloping behavior joining to the climate and snow accretion conditions.
- Ground collapse effect assessment due to earthquake
 - Integrated physical property test method, modeling method, and analysis method required in influence assessment of falling rock caused by slope failure on a nuclear facility. [N08082; N08084]
- Lightning risk management
 - Clarified generation features of lightning surge voltages and distribution of surge currents using full-scale experimental facilities aiming at establishment of a lightning protection design guide book for low voltage systems of customers.
 - Clarified lightning surge characteristics of the low voltage control circuits at the power plants and substations by model experiments and verified applicability of the numerical electromagnetic analysis program (VSTL) developed by CRIEPI from comparison between the experimental results and the numerical analysis. [H08004; H08017]
- Disaster recovering support of electric distribution equipment
 - Developed the disaster recovery support system of the power distribution equipment based on sequential data processing, composing of a seismic information system and a seismic damage estimation system, and an emergency recovery process simulator.
- Maintenance management of hydropower civil engineering facilities
 - Clarified a cave-in mechanism in the ground above headrace tunnel from observation of soil moisture behavior around the cave-in.
 - Investigated damage processes and failure modes of the dam spillway facilities and developed a practical non-linear dynamic response analysis method.

Risk management of electric power infrastructure (human risk)

- Cyber security risk management framework
 - Completed guidelines for correct, convenient, and operable cyber security risk management framework to large scale IT systems.
- Human error measures and safety culture cultivation
 - Developed function and its constructing element technology of “human performance increasing management support system” (Fig. 2). [Y08029]
 - Shared information through analysis of human error phenomena at domestic nuclear power plants and database construction.

Energy policy

- Japan type deregulation system measures
 - Clarified a situation of fuel cost coordination system in the United States and verified relation between fuel cost and retail rate in Europe. [Y08035; Y08036; Y08041]
- Scenario analysis for energy technical policy
 - To realize the low carbon society, we studied electrification scenario mainly composing promotion of energy saving and electrification, and utilization of low carbon emission electric power and proposed as one of promising resolutions to the global environmental problems (Fig. 3). [Y08026; Y08045; Y08046]

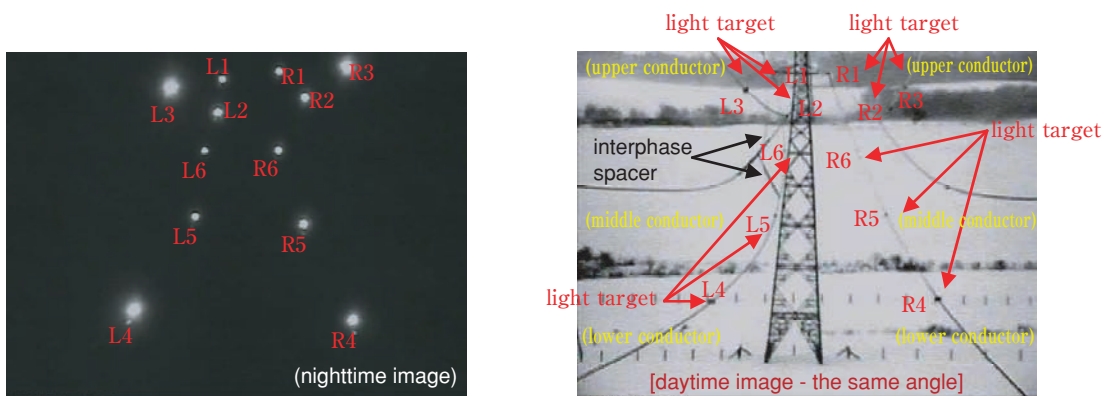


Fig.1 An image of a conductor oscillation at east area in Hokkaido [the north island of Japan] (2009/Jan/10)

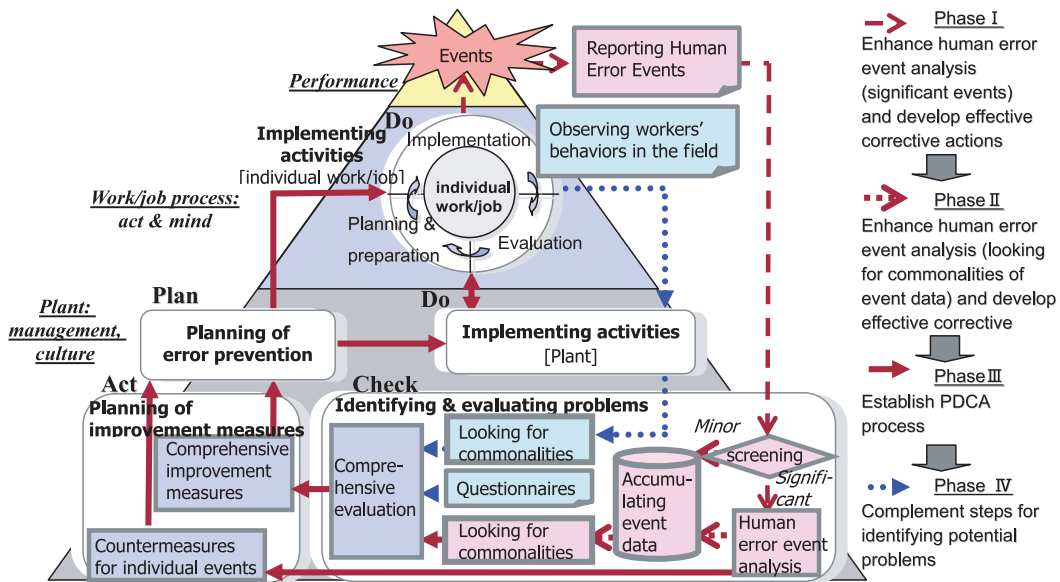


Fig.2 An entire picture of error management process and a phased approach for the establishment.

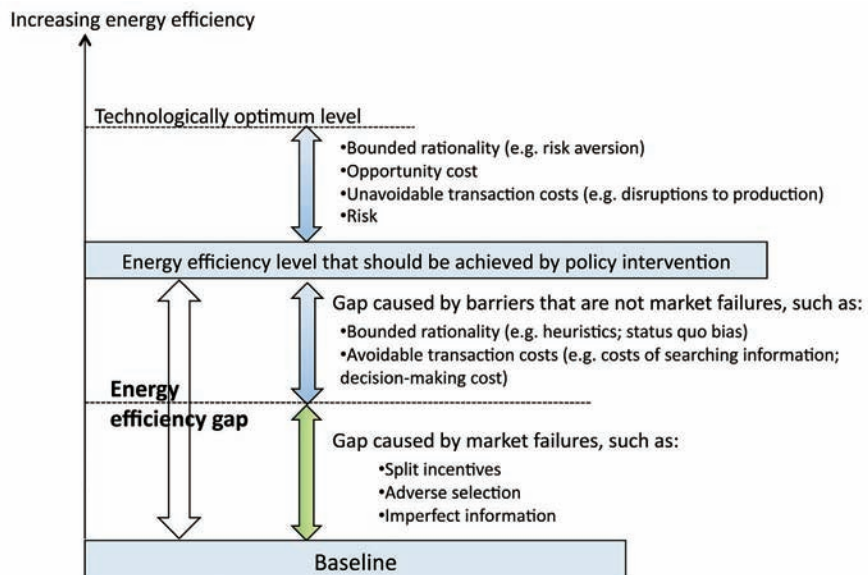


Fig.3 Energy efficiency barriers and policy intervention