

Chapter 14

Public Systems for Disaster Management



Kazuhiko Takano, Koji Ichii, Shozo Nagata, and Eiichi Yamasaki

Abstract In a law-abiding nation, the law plays a big role in maintaining social peace and people's safety. This chapter overviews the document system of laws and guidelines and roles of administrative organizations and corporations.

Keywords Design standards · Standardization · Watchman state · Welfare state

14.1 Societal Safety and Legal System

14.1.1 *What Is Law? System of Law*

Japan has a system of various laws with the Constitution at the top. Legal regulations that the National Diet set include the Civil Code that regulates relations among private individuals, the Penal Code that is the substantive law about crimes and penal, the Administrative Code that is the positive law about actions of administrative rights and corporations, and so on. Details of laws are often regulated by Cabinet Orders by the Cabinet Office and Ministerial Orders by each ministry. Cabinet Orders and Ministerial Orders are often collectively called governmental and ministerial ordinance. Governmental and ministerial ordinances can be issued by the administration without discussions in the Diet, and since they are commissioned by the law, they have legal bindings. In addition to orders, administrative organizations can issue notices, manuals, guidelines, and alike, but they are not legally binding. On the other hand, local governments can issue municipal ordinances based on Local Autonomy Act, as long as they do not violate laws and orders of the nation.

K. Takano (✉) · K. Ichii · S. Nagata · E. Yamasaki
Faculty of Societal Safety Sciences, Kansai University, Takatsuki, Osaka, Japan
e-mail: takano@kansai-u.ac.jp

Administrative organizations enforce ex ante regulations for securing safety of products, services, facilities, and so on. For example, Article 1 of the Travel Agency Act requires registration of travel agencies to “secure safety of travel.” Article 1 of the Electricity Business Act sets its purpose to “assure public safety and promote environmental preservation.” Administrative entities supply the details like the safety standards through governmental and ministerial ordinances that are commissioned by these acts. Ex ante regulation in most cases is arranged through licensing systems for the business entities. Recent interpretation, however, with the exception of special fields like nuclear power safety, by comparing citizen’s rights and public welfare, is “Minimum set of regulations appropriate for countering risks should be enforced” (Furuta and Nagasaki 2016). In the complex modern society, ex ante regulation means direct rise of administrative cost. So, in recent years, ex ante regulations are relaxed to the extent possible, and the idea is to provide means of ex post rescues in the form of litigation in case of conflicts. Relaxation of ex ante regulations allowed corporations to carry out businesses in a freer manner than before; however, they must prepare systems to prevent affairs and accidents beforehand so they can prove they had prepared reasonable prevention measures in case of lawsuits.

14.1.2 Corporations and Societal Safety

Corporations that provide goods and services around us have heavy responsibilities about keeping our societies safe and secure. Corporations have to prevent product malfunctions and accidents by employees’ errors. Companies that produce goods and hire employees have a number of legal liabilities about safety management.

Recently, with the ex post rescue system, laws have been enforced to require companies to build autonomous safety management systems. The Companies Act enacted in 2005 states that the director has to construct an internal controls system and commissioned the Ministry of Justice Order (Ordinance for Enforcement of the Companies Act) enacted in 2006 to set the details. The ordinance imposes the duty to corporate groups to build “a system to regulate the management of risks of loss” across the entire group, i.e., a risk management system (Article 100, Paragraph 1, Items 2 and 5).

The level of risk management systems required with Companies Act is, according to judicial precedents, “A management system that fits the size and characteristics of the business” or “an adequate risk management system that were deemed standard (at the time it was built).” The judicial precedents show the contents of risk management systems are within the discretion of the executives (Daiwa Bank Shareholder Case, Osaka District Court, 20 Sept. 2000; Yakult Honsha Shareholder Case, Tokyo District Court, 16 Dec. 2004). “Manuals” and “guidelines” by the administration work as standards at the time provide incentives for companies to refer and follow them.

Laws that hold the director of businesses responsible after breakouts of disasters or accidents are the negligence of management and supervision in Punishment for Causing Death or Injury through Negligence in the Pursuit of Social Activities (Penal Code Article 211). This punishment applies to the direct offender; however, according to judicial precedents, while the death or injury could have been prevented, when the director or supervisor neglected “management or supervision” of the direct offender, ruling of violence of duty of care has been made depending on the degree of malicious intent. This is probably because by holding the director of the facility or the company in case of a large facility fire or product accident, the Penal Code is expecting corporations to polish up their safety management system. The conditional requirement foreseeability, however, needs “actual concern”; thus, it is difficult to say that the director or supervisor, who is not the direct offender, has foreseeability. The ruling with Morinaga Milk arsenic poisoning incident adopted the vague anxiety “feel of concern” for foreseeability (Takamatsu High Court Ruling 31 Mar. 1966); however, it is no longer supported.

14.1.3 Central and Local Governments and Societal Safety

The central and local governments have the first mission of maintaining and securing societal safety. They put a number of administrative methods in practice to accomplish the requirement: supervision and regulation; benefit, support, and compensation payments; administrative legislation; administrative planning; administrative guidance; administrative contracting; information gathering; management; provision; administration enforcement and penal punishment; building and operating facilities; and so on. Many of these practices are based on regulations and ordinances, and the congress and councils control the administration with laws, i.e., the “principle of law (ordinance) based administration” is in effect. The laws and ordinances spell out the concepts of administrative practices by the nation, prefecture, and municipalities for maintaining and securing societal safety. We can even say that the laws and ordinances describe how societal safety is secured and maintained.

Traditionally, the central and local governments put efforts in maintenance and securing of societal safety by prohibiting businesses and actions that pose threats to societal safety and licensing systems to allow the operation under some conditions or applications. Most activities by corporations require approval or licenses, and the governments and corporations are in regulator and regulated relations, but we can say they cooperate in keeping and securing societal safety. The Administrative Procedure Act (2005) states to set the review standards (Article 5), make efforts to set standard processing time (Article 6), ban return or denial of flawless applications (Article 7), post the reason in case of denying an application (Article 8), provide information necessary for application and the review progress (Article 9), and make efforts to organize public hearings if interest of people other than the applicants needs consideration (Article 10).

Taking public health, for example, the Community Health Act states to build prefectural health centers and municipality health centers, set basic guidelines for local health measures, and build plans for supporting the securing of enough human resources to execute the measures. The Act on Prevention of Infectious Diseases and Medical Care for Patients Suffering Infectious Diseases sets the basic guideline for infectious disease prevention, collection and publication of information about infectious diseases, instructing people about hospitalization, restriction of employment, and so on. The Act Concerning the Measures for Protection of the People in Armed Attack Situations, etc. sets basic guidelines for protecting the people of Japan, establishment of prefectural and municipal council for resident protection, and evacuation and rescue of residents.

Since the decentralization reform started in the mid-1990s, many authorities about regulation held by the central government were delegated to local governments. The move made local governments set their own ordinances, interpret and carry out the laws, and in cases find themselves in the midst of litigations. The terms “political legal affairs” and “regional legal affairs” are phrases born from the delegation of authorities from the central government to the local governments.

14.2 Administrative System and Societal Safety

14.2.1 Concept of Nation and Societal Safety: Watchman State and Welfare State

The concept of nation that it should keep the necessary minimum duties, primarily of defense, security, diplomacy, jurisdiction, and public projects (roads, rivers, ports, and so on), is called the concept of night-watchman state (minarchism, or small government). F. Lassalle (1884) of Germany criticized night-watchman state concept in the UK at the time and demanded government intervention into wider areas. *Beveridge Report* (1942) in the UK also claimed the needs for a social security system by the state and a public mutual support system. Since around the time of World War II, the theory of welfare state (active state, large government), i.e., the concept that the government should actively be involved in socioeconomic areas, was on the rise.

While the concept of nations shifted from minarchism to active states, T. H. Marshall (1950) of the UK argued that social demand for citizen’s rights will shift from basic rights (body, opinion, ideology, conscious, property, freedom to sue) to basic political rights (rights to vote) and eventually to basic social rights (live, social). The trend is to value basic social rights, and the roles of the state and the executing organization the administration has been gradually expanding to today.

14.2.2 Societal Safety and Administrative Offices

14.2.2.1 Police and Administration

Police is the administrative organization in charge of maintaining public peace and securing safety of civil life. Police activity, in general, is separated into administrative policing (traffic control and patrol) and judicial policing (criminal investigation, arresting, and house searching) based on the principle of separation of the three functions of the government. The general police force and self-defense army are separate organizations in Japan; however, some countries over the world have military police with the function to maintain orders in military organizations but at the same time also hold the general policing functions of administrative and judicial.

The national police of the Home Ministry Police Affairs Bureau was in charge of police administration in Japan until World War II. After the War, the administration organized local government police (municipality police) under the former Police Act (1947); however, their capacity to counter wide-area crimes went down, and the organizations corrupted (lack of motivation with the policemen and collusion with underground criminal organizations). To counter the situation, the new Police Act was enacted in 1954, and with the establishment of the National Police Agency, prefectural police system went into effect.

14.2.2.2 Self-Defense and Administration

Protecting the country against military threats from foreign countries with military force is defense. To counter military threats with full power including military force added with politics, foreign diplomacy, economics, and scientific technology is called national defense. In Japan, the Ministry of Defense (MOD) is in charge of defense, and the National Security Council, newly established in 1986 after abolishing National Defense Council, is in charge of national defense.

After World War II, the Japanese military was demobilized, and in 1954, the Act for Establishment of the Defense Agency (currently the Act for Establishment of the MOD) and the Self-Defense Forces Act were enacted to establish the Defense Agency (currently the MOD) and Self-Defense Forces. The Self-Defense Forces and three forces of Air, Maritime, and Ground have an overall count of about 240,000 people.

14.2.2.3 Natural Disasters and Administration in Japan

Responding to nature's threats is an important function of the policymaker since ancient times, and today, it is called disaster management administration. Disaster

management administration works on preparations for reducing and controlling damages caused by disasters before they break out, on preventing damages upon disasters, and further on recovery from the suffering from disasters. In prewar Japan, the Home Ministry Police Affairs Bureau was in charge of disaster administration at the national level. The postwar disaster management administration was first assigned to the Office for Disaster Management of the General Administrative Agency of the Cabinet and then was transferred to National Land Agency in 1974 and then to the Cabinet Office in 2001. Disaster management administration involves a wide administrative area, and other ministries and agencies carry out disaster management administration that relates to their own administrative fields.

Triggered by the 1959 Isewan typhoon, the Basic Act on Disaster Control Measures was enacted primarily to counter wind and water disasters with local governments (mainly municipalities) at the center of response. Under this law, municipality governments are the primary players in responding to actual disasters (principle of municipalities having the first responsibilities). In recent years, however, more disasters with different sizes and types compared to the time of the Basic Act on Disaster Control Measures are revealing limits to disaster response with municipalities as the main players.

14.2.2.4 Advancement of Scientific Technology and Administration

Advancement of scientific technology in the modern era brought a number of benefits to human; however, at the same time, it caused industrial injuries and destruction of the environment and elevated the risk of nuclear disasters. There is now, therefore, new administrative needs to secure the safety of the workers and citizens.

The history tells us the industrial injuries increased with the development of the industrial revolution. Factory laws in the UK and other countries in the nineteenth century later developed into labor safety administration and labor health administration.

In Japan before World War II, Engineering Bureau of the Ministry of Agriculture and Commerce was in charge of labor safety administration. After the War, labor safety administration was transferred to the Ministry of Labor, and the 2001 reform placed the responsibility with the MHLW. Labor health administration, on the other hand, had been under the jurisdiction of the Ministry of Health and Welfare before and after the War, and since 2001, the MHLW is in charge.

The postwar high economic growth in Japan caused pollutions at various locations in the country. Pollution countermeasure administration and pollution prevention administration started with the 1967 Basic Law for Environmental Pollution Control developed into environmental administration. The Environment Agency was in charge of pollution countermeasure administration and pollution prevention administration, and in 2001, it was promoted to a ministry, and now the Ministry of the Environment (MOE) is in charge. Waste management administration was also transferred from the Ministry of Health and Welfare to the MOE.

Nuclear safety administration, on the other hand, was under the jurisdiction of the Science and Technology Agency. In response to the 1999 JCO criticality accident in Tokai-mura (IAEA 1999), the administration office function of the Nuclear Safety Commission was transferred to the General Administrative Agency of the Cabinet. Further, the 2001 reformation placed the commission and administration office under the Cabinet Office, and “Nuclear and Industrial Safety Agency” was established within the Ministry of Economy, Trade and Industry (METI). Nuclear and Industrial Safety Agency, however, was closed together with Nuclear Safety Commission after the 2011 Fukushima Daiichi NPP accident. In 2012, a new organization Nuclear Regulation Authority to handle all of nuclear safety administration started as an affiliated agency of the MOE.

14.2.2.5 Health Maintenance and Administration in Japan

Once we entered the modern era, urbanization worsened the living environment, and systematic health administration was in need. In general, systematic health promoting activities by the public and private organizations for the health maintenance and promotion of people is called public health. The public health administration in the broad sense in Japan has three activities: (1) general public health administration for households and local societies, (2) school health administration for schools, and (3) labor health administration for the workplace.

General health administration which the MHLW is in charge of is carried out at health centers based on the Health Center Law revised in 1947. The Community Health Act was enacted in 1994 and municipalities are now in charge of basic health services. Prefectural health centers were set in prefectures and ordinance-designated cities, and recently core cities also have the duty to set health centers.

The Ministry of Education, Culture, Sports, Science and Technology (MEXT) is in charge of school health administration. Activities to manage health of students and school personnel and school health activities are carried out under the School Health and Safety Act. The Ministry of Labor was in charge of labor health administration; however, the function was transferred to the Labor Standards Bureau of the MHLW since the 2001 reform. Activities include 347 Labor Standards Offices throughout the country to monitor and instruct proper protection of worker’s health.

14.2.2.6 Traffic and Administration

The advancement of scientific technology developed means of transportation that move with mechanical energy, giving birth to the needs of safety in transportation. Accidents that take place with transportation, including traffic accidents on the road, railway accidents, marine accidents, and aircraft accidents, are called transport accidents.

In Japan, the number of deaths with traffic accidents on the road exceeded 15,000 in 1969. To counter, the Basic Act on Traffic Safety Measures was enacted in 1970,

and the Cabinet Office is, since then, in charge of overall arrangement of transportation safety administration (formerly duties of the Management and Coordination Agency of the General Administrative Agency of the Cabinet). Practical safety administration for the railway, marine, and aircraft is primarily carried out by the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) who has jurisdiction over these industries. The National Police Agency is in charge of prevention of traffic accidents on the road and maintenance of orders on the road.

14.2.2.7 Consumers and Administration

The basic social rights we discussed in Sect. 14.2.1 expanded, and it gave rise to the social need that administration should protect safety of the consumers to give birth to a new administrative field of consumer administration (consumer protection administration). After World War II, Japan and other countries over the world recognized the need to protect consumers, and ministries and agencies took on consumer administration. Organizations to specialize in consumer administration, however, started mainly after the year 2000. In other countries, there are cases that consumer administration and industrial administration are carried out in a single organization, or the agency in charge of economy and industry is also looking after consumer administration.

In Japan, choking on hard and small jelly candies, poisoning with China-made frozen dumplings, Paloma gas water heater-caused deaths, and other accidents revealed delay in administrative responses, and enhancing consumer administration turned into an urgent matter. In 2009, as a result, the Consumer Affairs Agency affiliated to the Cabinet Office was established.

14.3 Standardization and Standards

14.3.1 Value and Convenience of Standardization

14.3.1.1 What Is Standardization?

ISO/IEC Guide 2 (2004) defines “standard” as “document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.” Further, “standards should be based on the consolidated results of science, technology and experience, and

aimed at the promotion of optimum community benefits.” Similarly, “standardization” is defined as “activity of establishing, with regard to actual or potential problems, provisions for common and repeated use, aimed at the achievement of the optimum degree of order in a given context.”

“Standards” define the rules about how products and other matters should be. When standards spread in the society and people take actions following the standards, they will guarantee quality to the set levels no matter who makes the products or who works on them. For the society, standardization is absolutely one way of securing safety (Russel 2005). Not just standards and authentication but also languages and units (measures) are also results of standardization. The first Emperor Qin Shi Huang of the Qin dynasty is historically famous for unifying measures. In our daily life, we are surrounded by standards like cylindrical batteries (A, AA, AAA, etc.), paper size (A4, B4, etc.), USB cable connector shapes (Type A, Type B, etc.), and so on. We can even say that our societies are filled with products and services made with standardization. “Standards” are explicitly written down so their contents spread without misunderstanding. Depending on the geographic, politic, or economic level of the organization conducting standardization, standards are categorized into four levels of hierarchy of international, regional, national, and organizational.

14.3.1.2 Value of Standardization and Problems

Wide transfer of precise information promotes better mutual understanding. The consumer can be assured of safe and secure lives with proper maintenance of product qualities. Companies can widely spread technologies they developed to enhance production efficiency, strengthen competitiveness in the industry, and contribute to environment protection. Further, the products will be assured of compatibility and interface consistency for international competition, and export will grow. In a sense, standardization is a process for gaining initiative in the market. In other words, standardization itself is the result of the competition for gaining initiative.

Members of the World Trade Organization (WTO), with the 1995 WTO/Technical Barriers to Trade (TBT) Agreement, will start to set their national standards in accordance to international standards. In general, rules are advantageous to the one that set them. If one fails to push international standards to one’s claim, the products cannot enter the international market, and additional cost to adjust the products to international standards is unavoidable. Japan, with its high technology, can easily clear the international standards; however, for the Japanese industries to continue their prosperity, Japan has to actively take part in developing international standards and strengthen its international influence.

14.3.2 International Standards: Organization and Activities of ISO

14.3.2.1 International Standards and International Standardization Organizations

Well-known organizations that develop international standards are the following three:

ISO (International Organization for Standardization)

All fields except electronic and electronic communication

IEC (International Electrotechnical Commission)

All fields of electrotechnology

ITU (International Telecommunication Union)

Information and communication technologies

14.3.2.2 Organization and Activities of ISO

ISO established in 1947 has 163 member countries as of July of 2017. Only one organization from each member country can participate in ISO. Japanese Industrial Standards Committee (JISC) joined ISO from Japan in 1952. The organization of ISO consists of General Assembly, ISO Council, Technical Management Board, Technical Committees, subcommittees, and working groups. The process of developing ISO standards is proposal stage, preparatory stage, committee stage, enquiry stage, approval stage, and publication stage. Primary groups that approve the standards are the Technical Committees. As of July 2017, there are 309 Technical Committees for the various fields.

14.3.2.3 National Standards of Japan

A well-known national standard in Japan is the Japanese Industrial Standards (JIS). JIS is a set of standards based on Industrial Standardization Act. The purpose of Industrial Standardization Act (1949) is to:

Promote industrial standardization by enacting and disseminating appropriate and rational industrial standards and, thereby, improve the quality of mineral or industrial products, increase productivity and otherwise rationalize production, simplify and make transactions

fair, and rationalize the use or consumption of mineral or industrial products and also contribute to the enhancement of public welfare. (Article 1)

JIS has three standards of product, methodology, and basics. The Minister of the primary industry discusses setting JIS standards to JISC, and based on the discussions and responses at JISC, the Minister sets them. When a product is certified to conform to the product standards by a registered certification organization, the producer can display JIS logo on its products.

14.4 Design Standards for Structures and Systems for Securing Safety

14.4.1 Design Standards for Structures

Our lives are supported by a number of structures including the residence that we reside in, roads, railway bridges, water supply and sewage, and so on. Sudden destruction of these structures from insufficient strength due to a design flaw or degradation over time or unexpected damage caused by a natural disaster is socially not tolerated. These structures, therefore, are subject to control by applicable government offices which enforce design standards so they hold set levels of strength. For example, buildings are administered by MLIT, and the Building Standards Act for “the purpose of protecting the lives, persons and property of the public, thereby contributing to improvement of public welfare” defines “minimum criteria for the site, structure, facility, and intended use.”

In addition to buildings, e.g., road bridges, railway bridges, port facilities, tunnels, and gas tanks, there are a variety of structures, and each of them has design standards (technical standards) enforced by an applicable government office. Depending on the type of structure, their physical properties of sites, shapes, dimensions, and necessary strengths vary and different design standards (technical standards) apply to different types of structures. For example, highway bridges, administered by the Bureau of Public Roads of MLIT, follow “Specifications for Road Bridges,” while designs of railway bridges, administered by the Railway Bureau of MLIT, are based on “Design Standards for Railway Structures,” and port facilities administered by the Port and Harbor Bureau of MLIT are designed based on “Technical Standards for Port and Harbor Facilities.” Structures and their design standards are, thus, primarily administered by MLIT, whereas the METI administers industrial tanks, and the Fisheries Agency administers fishing harbors.

Design standards (technical standards) have legal backings. For example, Article 30 of the Road Act regulates that Cabinet Orders determine highways, national roads, and structures of national roads. The corresponding Cabinet Order, the

Government Order on Road Design Standards, Article 35, Section 4, specifies that a MLIT Order determines necessary specifications about standards of road structures. And the MLIT Order, Order for Enforcement of Road Design Standards, regulates that road bridges and so have to hold sufficient safety against earthquakes and so. Specifications for Road Bridges is a Circular Notice that explains methods and standards for judging “sufficient safety,” and in general, road bridges are actually designed by referring to “Specifications for Road Bridges and Their Descriptions.”

For buildings, the Building Standards Act (2018), Article 20, requires that “to meet technical standards defined by orders about structures and methods necessary for safety.” Actual requirements are specified with orders or Circular Notices, instead of laws, because in that way, contents can be reviewed and revised as necessary. Regulations about aseismic design are especially important among design standards in Japan with frequent earthquakes. Foreign countries have a variety of design standards with magnitudes and frequencies that vary with location. With the standards, Japan builds structures with higher strength against earthquakes.

Adding cost will allow building a robust structure. In general, however, structural design balances the cost and benefit, and there is no clear answer to how robust a structure has to be in terms of withstanding an earthquake. Nevertheless, important structures like those built for NPP require extremely high earthquake resistance. The level of earthquake-caused damages socially allowed on structures depends on how the economics have advanced and on past experiences of damages. The criterion is not that easy to determine.

In modern Japan, whenever an earthquake caused major damage, the standards of aseismic design were reviewed. For example, the Building Standards Act enacted in 1950 had new aseismic standards with a secondary design added in 1981. The addition was the results of experiencing the 1968 Tokachi-oki earthquake and the 1978 Miyagiken-oki earthquake so the building would not collapse or fall even in the case of earthquakes with intensity 7. The 1995 Great Hanshin-Awaji earthquake disaster led to introducing a new performance-based standard for easier approval of new construction methods.

14.4.2 Introduction of Performance-Based Design and Qualification/Certification of Engineers

The design process of structures determines material to construct the structure with and the shape of the structure. The less constraints there are about material and shape, the easier it is for the designer to build the structure to his idea; however, assuring safety with the finished structure turns harder. Conventional design standards were based on regulating the specification so safety was assured with the design specification. The idea was limiting the range of the designer’s free selection would lead to material, shape, and construction methods that were conformant to the specification in the standard, so safety is assured without elaborate calculation.

In recent years, sophisticated calculation spread to the actual fields to foresee structural response to earthquakes and assure safety. A number of design standards (technical standards), thus, have adopted the concept of performance-based design to allow high level of freedom with the designs. Performance-based design is a method that sets the performance requirement about structures and verifies that the structures meet them. The 1995 Great Hanshin-Awaji earthquake in Japan recorded surprisingly large seismic shakings, and the practice of aseismic design then recognized the need to plan against huge earthquakes at the time of design even if such earthquakes are extremely rare but they can cause serious damages. Building structures that remain completely undamaged upon such earthquakes, however, is not practical, and controlling the predicted damages (structural members that suffer damages and their levels) is effective. Then functional design with higher degree of design freedom but with structural damages within tolerable ranges is now in demand.

Performance-based design with sophisticated numerical analysis is now possible; however, verifying the design is still difficult. We cannot deny possible numerical errors especially with design calculations using computer programs; however, verifying there are no data-input errors or if the program has no bugs is a tedious work. How structures respond to earthquakes requires insights of dynamics based on technical knowledge; thus, only some skilled engineers have chances to recognize flaws in designs. The needs are high, therefore, about systems for qualifying design engineers, approving computer programs for design, and certifying the design results.

14.4.3 Nonconformance of Existing Structures and Fraud by Engineers

Properly designing new structures can meet the required safety level at the time of design. Requirements of design standards (technical standards) are the “minimum levels” at the time when the standards were set, and as the society moves forward, requirements about levels of safety often go up. As a result, existing structures that do not meet the current required design standards (technical standards) are scattered here and there. Such structures are called “existing and nonconforming.”

The Building Standards Act of Japan states that for “buildings that currently exist,” “These standards do not apply.” Therefore, buildings that do not meet earthquake resistance requirement with current design standards (technical standards) can continue to exist for occupancy as “existing and nonconforming buildings.” To demolish and rebuild buildings every time the aseismic requirements of the design standards are revised is practically impossible, and thus the regulation may be so for realistic reasons. From the safety standpoint, however, the existence of a number of buildings with low earthquake resistance is a concern. If a building was built without meeting the standards of the time, however, it is illegal and it requires

correction. Also, in case of large-scale repair, extension, or reconstruction, the new standards apply (in principle).

In terms of securing safety for the society, even structures owned by individuals or corporations should go through seismic diagnosis and aseismic reinforcement. In 1996, the Act on Promotion of Seismic Retrofitting of Buildings was enforced, and efforts for enhancing seismic resistance have been to be made with buildings with weak earthquake resistance like existing and nonconforming buildings through seismic diagnosis and adequate aseismic reinforcement based on the diagnosis results. The 2013 revision of the above Act specified “buildings for a large number of unspecified people like hospitals, stores, hotels, or so, and large-scale buildings that require special attention during evacuation of their occupants like schools, nursing homes, and so have to go through mandatory seismic diagnosis and the results are published.”

As design standards (technical standards) shape up and seismic diagnosis and aseismic reinforcement are promoted, those who actually carry out the safety evaluation are engineers. In 2005, a first-class registered architect was found to have forged a number of structural strength reports. It was assumed he wanted to lower the construction cost by saving parts and materials by falsifying the design calculation. Motivations to falsify aseismic evaluation constantly exist; thus, it is important that engineers need to have the right understanding of rules and conform with standards (engineering ethics) that engineers have to follow. Also, a system to have a third party verify the design and structural calculation and the construction progress so engineers cannot be involved in fraudulent actions is also in need for securing safety of structures.

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