Agendas for addressing building Standards' maintenance

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1. Introduction

In architectural research department, the mission is to support administration for technical standards of architecture, fire protection and facilities / environment in Building Standards Act, Housing Quality Assurance Act and Energy Saving Act to achieve safety and security and comfortable living environment. Regarding agendas that has been addressed to create standard draft for earthquake disaster based on research estimates in research assignments that the architectural department has addressed and building standards' maintenance promotion business to maintenance standards, and these will be explained here. Situation and trend in each area are as follows;

Architecture area: Building certification / examination was tightened by the amendment of Building Standards Act in 2006 for prevention of recurrence of those cases such as the architecture accounting statement deception case. And after that, various measures have been implemented to promote the institution smoothly.

Fire protection area: Act for Promotion of Use of Wood in Public Buildings has been promulgated and implemented in 2010, but the possibility of easing of regulations in Building Standards Act by a research regarding fire resistance of wooden building has been considered.

Environment area: Various measures have been implemented for energy reduction during construction and operation.

Regarding The Great East Japan Earthquake, Tsunami, ceiling falling off, escalator dropping, soil liquefaction and long-period ground shaking have been considered to be necessary items that are needed to be addressed in technical standards.

2. Project research

There are 4 NILIM projects that the architectural research department has been addressing.

『Development of urban system for low-carbon and hydrogen energy system (hydrogen full pro) (2009-2012)』Using hydrogen as an energy media, it is to develop construction technology to achieve minimization of hydrogen plumbing in safety with CO2 emission for a formulation of urban energy system that does not depend on fossil fuel too much. It is to develop measures to assess fossil fuel dependence of city along with load curtailment of construction side, using high- efficiency equipments and renewable energy facility.

『Development of evaluation of seismic capacity technology for architectural structures which responds to upgrading of ground shaking information.(high earthquake resistant full pro) (2010-2012)』 It is possible to figure out the characteristic of ground shaking at a voluntary point with recent maintenance of seismic network and progress of seismology. In ground shaking that is observed or predicted, there is some ground shaking that exceeds designed earthquake load which is a supposition of current aseismic design. On the other hand, earthquake load that acts on architectural structures are known that has a possibility to be cut down if ground shaking on the ground level is deemed to enter directly to architectural structures. It is important to find out the relationship between 『ground shaking』 and 『earthquake load』 along with predicting ground shaking accurately to assess seismic capacity properly.

Therefore development of seismic capacity assessment technology for more reasonable architectural structures that respond to upgrading of ground shaking information has been addressed with collecting and analyzing of earthquake observed records of as many architectural structures as possible.

『Research regarding an adoption of new technology of architectural structures that focus on renewable energy.(2011-2013) 』 energy consumption of architectural structures has been increasing with improvement in living standards. With proceeding thermal structure of architectural structures and equipment efficiency, it is important to use natural energy (renewable energy) that exists on the premises of architectural structures, and a formulation of new standards that have renewable energy is needed.

『Research regarding fire disaster security of three-story wooden schools(2011-2015) 』 Wood is effective to prevent global warming and low-carbon emissions during manufacturing compare to other

materials, and it also eases humidity change of room and has merits to augment comfort. However it has been hard to construct with wood, because high fire resistance has been required for three-story wooden schools by the Building Standards Act. Regarding these regulations, it is supposed to review based on the results of the research about fire resistance of wood due to the enforcement of 『Act for Promotion of Use of Wood in Public Buildings 2010』. It has been considered to contribute to maintenance of technical standard that can ensure security during fire disaster by actual fire experiment of three-story wooden school along with research and examination of element experiment and simulation to find out possible conditions to ease by technical aspect.

Except those project researches, 『Research regarding assessment measure and standard of earthquake-proof safety of exterior material』, 『Research regarding technical standard of structural calculation program that contributes to smooth architecture affairs』, 『Research regarding calculation method of evacuation safe performance and expected standard during building on fire』, and these researched have been addressed

3. Consideration, creation and presentation of technical standard draft

In architectural research department, agendas have set that responds to research and development, and correspondence based on the damage of The Great East Japan Earthquake, and consideration, creation and presentation of technical standard draft has been addressed. Main agendas especially related to The Great East Japan Earthquake are; 『Standards regarding requirements of Tsunami evacuation building in structure』, 『Standards regarding ceiling falling provision』, 『Consideration of measures for long period ground shaking』. And the one that the architectural research department was related to research and development are 『Consideration of review of fire prevention standards regarding large-scale wooden building.

Regarding these, Building Construction Standards Committee, Architecture Fire Protection Standards Committee that have knowledgeable persons from academic society are established and operated in NILIM. The structure that reviews technical standards based on opinions from strategists has been maintained.

The Building Construction Standards Committee has especially been considering The Great East Japan Earthquake. The committee has done a field investigation in April, 2011, and it started considering provisions based on architectural structure damages, and it took place 5 committee meetings by October, 2013. Based on these councils in the committee, it was reflected in Residence Chief Notice in November, 2011 『Review of guideline regarding requirements of Tsunami evacuation building in structure』, MLIT Announcement in December, 2011 『Technical Standard Announcement of designated evacuation facility based on Tsunami Disaster Prevention Regional Construction Act』 The committee had also invited opinions (Public opinion) regarding 『Technical Standards Draft for ceiling falling』 and 『Technical Standards Draft for escalator dropping prevention』 between July 31 and September 15, 2012.

Regarding these, it will be considered using Building Standards Maintenance Promotion Business. (Business that supports for the cost advertising for people who do collection and accumulation of basic data and technical knowledge from experimental trials about agendas that are set by the government for requirements to formulate and revise technical standards in Building Standards Act. Established in 2008, and research was implemented regarding 27 agendas in 2012.)

4. Challenges for the future

As challenges for the future related to the earthquake disaster, there are long period ground shaking provision, liquefaction of premises of residence measure.

Relate to long period ground shaking, it invite public opinions by presenting a long period ground shaking measure daft policy in December, 2010 before The Great East Japan Earthquake, and the draft policy will be reviewed by referring the consideration in Central Disaster Prevention Council and Headquarters of Earthquake Res. Promotion and observational data from The Great East Japan Earthquake. Regarding liquefaction of premises, simple liquefaction opinion measure that can apply to small - scale architectural structures by the Standard Maintenance Promotion Business has been considered.

The architectural research department has been doing administrative support with technical knowledge regarding technical draft formulation, and it also thinks that it is important to collect and accumulate knowledge by research including basic research and technical development, and the architectural research department works day after day.

Reference

1) TECHNICAL NOTE of NILIM No.699 pp.43-54
http://www.nilim.go.jp/lab/bcg/siryou/tnn/tnn0699pdf/ks069909.pdf