

## Promoting Commissioning Process in Japan

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### Synopsis

The author established the Building Services Commissioning Association (BSCxA) in Japan in summer 2004, which is now supported by almost 90 individual members and 14 supporting corporate members.

In Japan, HVAC engineers are very interested in commissioning from the viewpoints of technology and quality control, but recognition at the government side is quite small. Still, the author believes that the commissioning process, especially early on when cost must be invested by the owner, will eventually be widely accepted in the Japanese building community.

Preparing the Commissioning Guideline by SHASE, participating in Annex 40 to establish common definitions and develop the Cx management tool, the MQC, and BEMS-assisted tools have induced submission of many papers on commissioning to academic lecture meetings in Japan. As Japan is at the starting line for promoting the commissioning process, this paper will surmise the Cx situation in Japan and call for international collaboration and the frequent exchange of opinions in not only in the research field but also in practical business opportunities.

### **About the Author**

Nobuo Nakahara is a professor emeritus of Nagoya University and runs Nakahara Laboratory, Environmental Syst.-Tech., a consulting engineering office. He has a wide range of research experience and has made unparalleled contributions to Japanese HVAC engineering. He has initiated active building commissioning activities in Japan, led the SHASE Commissioning activities for nearly ten years to establish the Japanese Guideline and model documents for the HVAC Commissioning Process. He is the former chairman of Japan's committee for ECBCS/IEA Annex 40.

## Introduction and Background

Unlike in the United States, recognition at the government side for initial commissioning process is insufficient, basically because they do not recognize how actual performance on energy and environment in buildings (newly built or existing), is far from what they should be, and partly because they want to believe in vain that the Japanese architectural licensing system, which is based on integrated education and licensing for architectural planning, structural engineering and building services engineering is unique. Also, while most of actual HVAC designers who are originated in fields other than architectural engineering do not have this license and are not legally responsible for their design. Too many times for more than 25 years the author has claimed that the system shall be modified, before at last a grave scandal in the structural engineering field took place last fall concerning to anti-seismic building design.

However, checking procedure for legally regulated anti-seismic structural design is thought rather perfect with several steps of inspection through the building admission and construction phases, though basically it depends on design professional's dignity. Therefore, the commissioning process in our sense has never been applied to the structural design except for in-house quality control. In case of HVAC and energy plant design, legal constraints are few during the design stage before submittal to authority to request permission of building construction.

In the design for building services systems that include HVAC and energy plant, there are no vital legal regulations such as that for anti-seismic design because it is a completely different level of disaster on human lives. The results are that building owners totally depend on HVAC designers without knowing how poorly the energy and environmental performance of his or her building might be designed and handed over without sufficient performance testing and follow-ups. There is another point that completely differs from the situation in the United States. That is, we have no TAB professionals and the HVAC contractor is responsible for TAB himself. Therefore, in most cases keeping completion date becomes most important issue for the building owner and required number of days for TAB works is reduced to the minimum, for which the owner feels satisfactory without knowing how poor the resulting energy performance and environmental quality might be.

The author has been watching the development status of commissioning process into HVAC industry and further into building industry in the United States since 1980s. Participation to IEA/Annex 25 on BOFD, the building optimization and fault detection/diagnosis and Annex 40 on HVAC commissioning process for energy conservation spurred the author for urging committee activity to establish SHASE guideline on commissioning process and then to organize NPO body for promoting commissioning process into HVAC industry in Japan.

In due course, when people became to know the term "commissioning," some people used it as a measure to discriminate their companies from others only by performing their normal works as normal when the system showed poor performance because of insufficient TAB results by their own. Some designers or owners added a word "commissioning shall be performed" in their construction documents for contractors, but the bidders did not know well what commis-

sioning is and how far it would be requested, which naturally results any kinds of conflict at the completion and hand-over of the systems. In this way and with other phenomenon such as damping and cutting price of building construction in excessive competition, social fairness seemed to have been corrupted during the economic crisis era in 1990's and later still. The author thought that introducing commissioning "process" into Japanese society could recover beautiful moral that was forgotten from people's minds and lead the building construction society to normal condition where the right dominates.

## Activities for Promoting Commissioning Process

### *SHASE Activity for Commissioning Guideline*

The Society of Heating, Air-Conditioning and Sanitary Engineers of Japan (SHASE), a corporation, was established in 1917 as Heating and Refrigeration Association and changed its name as the present one in 1962. It also strengthened its academic activities with about eighteen thousand individual members all over the world. The research area is, as the name shows, HVAC, building environmental physics, sanitary engineering, water treatment and other building services engineering, excluding electrical engineering. In 1995, it was decided to include BEMS, the building and energy management system, into its research area. The author organized a BEMS committee, began establishing standard design procedure and documenting methods of BEMS and HVAC automatic control systems, preparing for open network system, extending energy management system to include performance verification system and fault detection technologies, and then establishing commissioning guideline.

After finishing the fundamental guideline on commissioning process for building commissioning guideline, the Commissioning Committee was established separately from the BEMS committee to finalize the formal commissioning process guideline. The ASHRAE Guideline on HVAC commissioning process issued in 1996 was referenced, and the author visited NCBC 2001 and PECI in 2003, which gave useful on-site knowledge. Drafting of the Guideline on Building Services Systems Commissioning Process was finalized on March 2004 and issued as SHASE Guideline in autumn, 2005. The table of contents of the guideline is as follows.

1. Object of the guideline
2. Scope
3. Definition of terminology
4. Various commissioning process and their applications
  - 4.1 Application of commissioning process
  - 4.2 Partial application of commissioning process
  - 4.3 Tools to practice commissioning process
5. Organization and role sharing of commissioning process
  - 5.1 Commissioning agent and commissioning authority
  - 5.2 Organization for commissioning practice
  - 5.3 Obligation and role of commissioning relating parties
  - 5.4 Management of executive meeting of commissioning process

- 5.5 Commissioning plan
- 6. Commissioning points at the program and design phases
- 7. Commissioning point at the elaboration phase for bidding
  - 7.1 Construction document and contract
  - 7.2 Preparation for construction commissioning at partial commissioning process
- 8. Commissioning point at construction phase
  - 8.1 Commissioning process at construction step
  - 8.2 Commissioning process at acceptance step
- 9. Commissioning point at post-acceptance step
- 10. Commissioning point at operation and occupancy phase
  - 10.1 Re-commissioning process
  - 10.2 Retro-commissioning process

#### References

#### Annexes:

- Annex-1 Division of commissioning process phases and steps, marking event at the division, principal procedures and kinds of commissioning process
- Annex-2 Standard flowchart of procedures for commissioning process and its explanation
- Annex-3 Organization for commissioning process
- Annex-4 Model quality control matrix, the index
- Annex-5 Responsibility of commissioning authority and commissioning relating parties
- Annex-6 Relationship among documentations for commissioning process
- Annex-7 Model document of request for proposal on commissioning process
- Annex-8 Model document of commissioning plan
- Annex-9 Division and responsibility among testing, adjusting and start-up and functional performance testing
- Annex-10 Definition and explanation on the terminology concerning to commissioning process  
Referencing documents

### ***IBEC Activity for IEA/Annexes***

IBEC, Institute for Building Environment and Energy Conservation, a foundation, was established in 1980 in order to promote energy conservation activities in building and housing through R&D, education and various types of promotion activities such as authorizing calculation / simulation programs, rewarding buildings with high energy performance, etc. Concerning to commissioning, IEA/Annex activities have been executed in this institute, which had been founded under the authority of construction ministry, since 1988 for Annex 16. The domestic shadow committees for Annex 25 and Annex 34 for BOFD and Annex 40 for HVAC commissioning were, and Annex 47 for additional research on commissioning process is, organized in this institution with the help of supporting companies and academic researchers. The author has had a leading role to perform researches and to contribute to international cooperation in this field.

The table of contents of the report of the Annex 40 for domestic use is as follows.

- 1. History of IEA/Annex works
- 2. Original research program of Annex 40
- 3. Progress of Annex 40 research

4. Final report
  - 4.1 COMMISSIONING, WHAT IS IT? WHY DO WE NEED IT?
  - 4.2 THE ANNEX 40 PROJECT
  - 4.3 THE COMMISSIONING PROCESS
  - 4.4 FUNCTIONAL PERFORMANCE TESTING (FTP)
  - 4.5 USING THE BUILDING CONTROL SYSTEM FOR COMMISSIONING
  - 4.6 USING MODELS IN COMMISSIONING
  - 4.7 VISIT COMMISSIONING PROJECTS
- APPENDIX 1: Glossary
- APPENDIX 2: Posters of the demonstration site
5. Terminology and how to use database
6. Annex-A MQC matrix as the commissioning process managing tool and database
- Annex-B MQC matrix for residential building
- Annex-C MQC matrix for non-residential building
- Annex-D Testing protocols by PG&E
- Annex-E Commissioning of BEMS
- Annex-F List of papers reported in Japanese
- Annex-G Annex-40 final report in English
- Annex-H Papers reported in English
- Annex-I CD-ROM (Annex-A~H)

## ***BSCxA Activity for Promoting Commissioning Business***

The BSCxA, Building Services Commissioning Association, was established in March, 2004 and registered as NPO in August of the same year. Before ending the chairman's role to establish SHASE commissioning guideline, the author asked the board of SHASE directors if it had any idea how to promote this process into HVAC society. The late SHASE president Prof. Shuzo Murakami recognized the importance of the commissioning process and promised to take an action for promotion. Meetings were held several times and the author's proposal to establish NPO body for work-sharing with SHASE, the former in the business standpoint and the latter in the academic standpoint, was admitted. Work sharing is shown in the **Table 1**.

## ***Commissioning Projects before BSCxA***

### **Vicious Trends**

The author referred to PECI's Model Commissioning and Guide Specifications and ASHRAE Guideline for Commissioning process issued in 1996 in preparing reference documents for initial commissioning processes and recognized the grave differences of way of thinking between Japan and the United States. The owner in general does never care for energy conservation with their own additional expense, and thinks it best to reduce initial investment. Most HVAC designers have been spoiled by the so-called "building-multi" system, VRV distributed packaged units, which has simplified air-conditioning system design to the level of choosing house room units, so that such high grade system design as to need HVAC system simulation program is rarely requested on duty, while it is very curious that CFD is popular tool for air distribution design even to the target system that could be better designed by designers' precious experience. So, designers have

**Table 1: Work Sharing between SHASE and BSCxA**

Division		SHASE	BSCA, NPO	Supposed Cx agents
No.	Organization	<ul style="list-style-type: none"> <li>Corporation</li> <li>Academic research and practical engineering for basic subjects of area</li> </ul>	<ul style="list-style-type: none"> <li>NPO</li> <li>Promotion of commissioning process, proposal of commissioning business model, education and training</li> </ul>	<ul style="list-style-type: none"> <li>Company, Individual professional</li> <li>Commissioning agents doing business on commissioning process</li> </ul>
	Cx Works			
1	Guideline	Issue, update	<ul style="list-style-type: none"> <li>Development of practitioner's commissioning documents and templates based on the guideline</li> </ul>	<ul style="list-style-type: none"> <li>Actual use for commissioning business and feedback to SHASE and BSCA</li> </ul>
		Public information	<ul style="list-style-type: none"> <li>News-letter and home-page, lectures and paper-submitting onto various media</li> </ul>	<ul style="list-style-type: none"> <li>Presentation to clients</li> </ul>
2	Tool development		<ul style="list-style-type: none"> <li>Research activity</li> <li>Discussion at the academic meeting</li> <li>Verification and standardization of tools</li> <li>Provide tools to commissioning consultants</li> </ul>	<ul style="list-style-type: none"> <li>Application to actual business</li> <li>Feedback to SHASE and BSCA</li> </ul>
3	Education / training	Guideline	<ul style="list-style-type: none"> <li>Lecture meeting</li> <li>Co-sponsoring lecture meetings</li> </ul>	<ul style="list-style-type: none"> <li>Participation, self study</li> </ul>
		Training	<ul style="list-style-type: none"> <li>Seminar, forum, training course on commissioning process model</li> <li>Practitioner's training course</li> <li>Education of commissioning authority</li> <li>Providing commissioning tools</li> </ul>	<ul style="list-style-type: none"> <li>Self study for commissioning authority</li> <li>CPD application to SHASE, etc.</li> <li>Experience feedback to SHASE and NPO</li> </ul>
4	Information exchange		<ul style="list-style-type: none"> <li>Academic research exchange between international and domestic societies</li> <li>Practical experience/knowledge exchange between international commissioning community</li> </ul>	<ul style="list-style-type: none"> <li>experience/knowledge exchange among association members</li> </ul>
5	Qualification (yet to be studied)		<ul style="list-style-type: none"> <li>Qualification standard</li> <li>Examination and its maintenance (?)</li> <li>(Discussion needed for relations among professional qualification)</li> <li>Registration and follow-up</li> <li>CPD</li> </ul>	<ul style="list-style-type: none"> <li>Application, professional occupation</li> </ul>
6	Social Enlightenment / PR	Lecture/Forum	<ul style="list-style-type: none"> <li>Enlighten SHASE members</li> <li>Enlighten citizens in general</li> <li>Open class for students</li> <li>Enlighten BSCA members</li> <li>Enlighten commissioning relating parties</li> <li>Enlighten building owners, clients</li> <li>Enlighten citizens in general</li> </ul>	
		Periodical publication	<ul style="list-style-type: none"> <li>Transactions</li> <li>News Letter</li> </ul>	
		Home page	<ul style="list-style-type: none"> <li>SHASE home page</li> <li>BSCA home page</li> </ul>	
		Publication	<ul style="list-style-type: none"> <li>Guidelines</li> <li>Design Handbook</li> <li>Commissioning handbook</li> <li>Reference documents, templates, example analyses</li> </ul>	
7	Entrusted business		<ul style="list-style-type: none"> <li>Research and development</li> <li>Commissioning business modeling</li> <li>Actual commissioning business</li> </ul>	<ul style="list-style-type: none"> <li>Participation</li> </ul>

lost dignity and much depends upon contractors' redesign and/or false VE processes. I dare say so, not only for adding value but also more for cost reduction that the result is the design document could not be realized as planned.

General contractors and building services system contractors get a job with deficit price but should earn money by above-mentioned false VE and by increasing business efficiency anyhow, and feel happy, or unhappy, to have insufficient time length for start-up and TAB works. Depending on building owners' insufficient recognition on how important the role of building management and operation are for decreasing energy consumption and upgrading indoor environment, operators have been hired with low salary and hardly requested to do high quality business such as proposing energy saving management, tuning control parameters seasonally to avoid improper actuator movements, analyze energy consumption for more optimized operation, etc. They were not educated and trained for operation of the given system, and even worse, design intent was not clarified and much less for control strategy of the system, partially or totally. As-built documents are hardly as built, so not only O&M but also contractors necessary to localize any concealed system elements later suffers in finding out where they correctly are.

This is neither the native character of Japanese or the conventional custom of construction business in Japan. It just began to turn counterclockwise after the economical boost in the latter half of 1980s, and continuing to collapse of it after 1990 under the desperate Liberal-Democratic Party's inefficient administration, ending up to Koizumi government.

And yet, not a few people must have struggled how to recover the virtue of the Japanese character, mixed together with the merit of new systems in the western world. This is why the author imported the idea of commissioning process for HVAC production and maintenance, and set forth during 1990s to search for the Japanese way of commissioning to introduce into Japanese construction society.

Then the author have come to believe that, except for actual firsthand experience, the models developed in the USA are not always applicable in Japan and perhaps, in the eastern world. It was lucky for me to know that even in the western world, the custom of construction business and desire for introducing commissioning process have different motivations while participating in IEA/Annex40 research project for HVAC commissioning process. The actual commissioning project for this object were searched for as follows. Although it should not be mentioned with pride that the only "real" commissioning projects have only been done or being done with a commissioning authority either served or consulted by the author. However, I cannot help introducing these pilot projects to explain Japanese state of the art, as no other examples exist.

## **Yamatake Research Center**

In March 2000, the director in charge of the new building construction who had been interested in commissioning process and participated in commissioning activity of SHASE, made his mind to apply initial commissioning process though it was already at the stage of construction step of the commissioning process, the outline of which is shown in **Figure A**. The owner's motivation to perform commissioning as a first trial on commercial buildings in Japan is as follows:

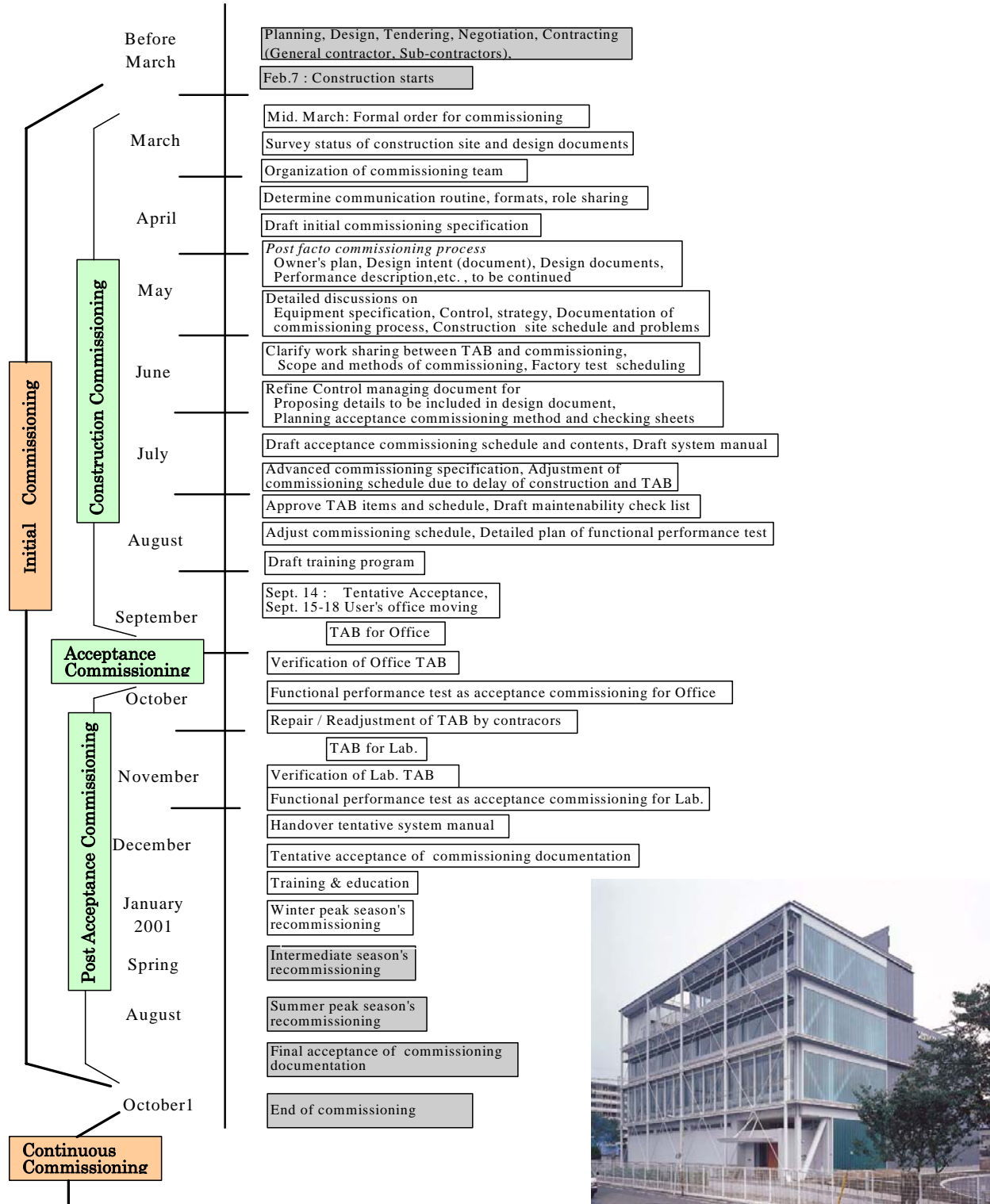


Figure A: Outline of commissioning process for Yamatake Research Center

1) The owner would have his building, which was well operational at the beginning of its use

and function as intended.

- 2) The owner wanted to have high performance building in energy and environment and ordered designer to realize it. Then he wanted the performance to be truly realized and commissioned.
- 3) Members concerned would understand the real commissioning process and problems which should contribute to the research of a learned society such as SHASE, propagate good commissioning practices and might create new business opportunities

Example of findings is as follows.

- 1) Information obtained to draft post-facto Design Intent Document and Owner's Project Requirement by tracing back to the program phase and design phase is few, so that commissioning standard could only be set up by invention using professional sense.
- 2) Reviewing and commissioning the design and the construction process, more than 100 clarifications and recommendations was pointed out as the *post facto* commissioning.
- 3) However hard the commissioning authority tried to verify TAB result and practice functional performance testing before occupancy, improper construction scheduling made it impossible to finalize the FPR before acceptance.
- 4) It is necessary to document actual controlled performance for environmental condition to guarantee in design document, i.e. sensing point to guarantee, temperature distribution, etc.
- 5) It is necessary to know the reason of vender selection in terms of durability, maintenance system, guarantee terms, popularity and actually measured performance data in addition to unit prices.

Detailed information of the building and commissioning process can be referred to a report [1] introduced at NCBC 2004, in Atlanta.

## **Toden Tachikawa Building**

Tokyo Electric Power Company decided to apply initial commissioning process in a research basis, (not in a business basis), to a construction phase and post acceptance step of a newly designed building named "Tachikawa Building" in 2002, when Yamatake commissioning project had nearly approached the final stage to submit final commissioning report after post-acceptance step, and when development of commissioning guideline by SHASE had been going to mature for the final stage. The objects are;

- 1) Establishing in-house HVAC commissioning concept and procedures
- 2) Energy and environmental quality control of the building
- 3) Contribution to SHASE guideline
- 4) Cooperate with practical HVAC engineers to bring up commissioning engineer and study 5W1H principle for initial commissioning process
- 5) Preparing Commissioning documents and templates systematically

Mr. K.Matsunawa, a director of Nikken Sekkei, A&E, took a role of CxA and chairman of the research committee, and the author contributed as an advisor, in order that if come-outs would coincide with the lines having been studied in SHASE, ASHRAE and IEA/Annex 40. Outline of the building is as follows.

- Total floor area: 16,765m<sup>2</sup>
- Type of building: Office with power control facility
- Chiller plant: Air-source heat pump: 2pcs of 245kW (Cooling capacity)
- Water source heat recovery heat pump: 245kW (ditto)
- Water thermal storage:  
Chilled water: 350m<sup>3</sup>+ heating water: 210m<sup>3</sup>



FigureB: Façade of Tachikawa building

Actions taken in the research process are as follows.

- Interview with the owner, designers and constructors.
- Development and verification of documentation tools
- Verification of construction conditions
- Verification of TAB results
- Execution of functional performance tests
- Operational data check assisted by BEMS
- Continuous commissioning and research until March 2006 and submit final report

要求文書名 要求記述項目 大項目 中項目 細目	(A) 必要文書・ 記述の有無 (設計者による 文書)	(B) 同左内容 (必要に 応じて 記述)	(C) 文書等の 過不足 確認 ○:合格 ×:不合格	(D) 内容の 妥当性 確認 ○:合格 ×:不合格	(E) 是正提案 (CA) ↓ (発注者・ 設計者)
2) 検計書					
2)-1 空調システム検計書	■有り □無し		○	○	
○ 部分負荷時運転対応	□有り ■無し		×	×	検計指示
・容量制御範囲	□有り □無し				
・システム対応	□有り □無し				
・機器対応	□有り □無し				
・その他	□有り □無し				
f 送風機器仕様決定	■有り □無し		○	○	
・空調機	■有り □無し		○	○	
・FCU	■有り □無し		○	○	
・その他	□有り ■無し		×	×	

Figure C: Example of checklist

Figure B shows the building facade and Figure C shows an example of checklist. Considering the level of details in applying commissioning process due to available expense, checklists were prepared for three stage of commissioning; fully detailed, intermediate and simple commissioning. However, simple commissioning may only be available for in-house engineers to enhance their management level and should not be called commissioning process.

## Commissioning Projects after BSCxA

### Atsuta Building, Renewal stage of Retro-commissioning process

Chubu Electric Power Company decided to apply retrocommissioning process to Atsuta Branch Office that was built in 1971 in Nagoya with 9,477m<sup>2</sup> of total floor area. Original energy plant consisted of centrifugal chiller with water thermal tank and boilers. The HVAC system was a very typical one, with CAV air handling units for interior zone and fan-coil units for perimeter zone. In 1988 the system was retrofitted to all-electric system together with introducing ice storage and VAV air-handling system. Existing equipment are as follows.

- Air-source heat pump: 2pcs of 70TR
- Water source heat recovery heat pump: 16TR

Water thermal storage tank: 600m<sup>3</sup>  
Ice-storage chilling unit: 30TR  
AHU: 4 pcs  
FCU: 140 pcs

The system has been degraded toward low efficiency with 20% capacity reduction for chillers and 20% more energy consumption. Maintenance cost has increased and indoor environment is not always comfortable. The owner made previous survey hiring consultants to diagnose degree of degradation for heat pumps, thermal storage tanks, air handling units and fan-coil units. The owner also has been developing new energy management system in remote station and wanted to introduce the system as the first case. After the survey, it was decided to renew the system pointing at energy plant, air-handling unit and all the VAV units and corresponding control systems.

The author was invited as commissioning authority, not as full-duty CxA but as consulting CxA, in order that the owner wanted to save cost and wanted to bring up in-house commissioning engineer, serving as assistant CxA in this project. Design commissioning has just ended and it now on the elaboration phase and then will go to construction phase in spring 2006. As described before, the BSCxA, NPO is the contracting body and it intends to accumulate these kinds of experience for establishing standard model commissioning process. This time it is the retro-commissioning model.

The process has followed as;

- 1) Reviewed the system survey report and develop OA's idea for retro-commissioning
- 2) Hearing from the owner about the intent of retrofit was made.
- 3) Develop owner's program on behalf of the owner
- 4) Executed air-conditioning load calculation in order to bring up optimal energy plant idea, especially to know the degree of heat recovery from the inside heat generation. Newly developed Window-based dynamic load calculation was used.
- 5) Rough planning on energy plant and HVAC system was made and assure if the space for equipments is enough.
- 6) Survey on the past energy consumption of the building and that of same kinds of owner's buildings was made to figure out energy budget goal.
- 7) Drafted owner's Project Requirement
- 8) Drafted commissioning plan for its design phase.
- 9) Request for proposal of design professional was developed and issued.
- 10) Reviewed proposals from design professional to admit.
- 11) Reviewed preliminary design document.
- 12) Reviewed design development in at 5%, 50%, 95% of working drawing step and 100% at elaboration phase.
- 13) A lot of information exchange on design problems was discussed through issue log sheets with attached documents.

The process is now at the edge of bidding process in February, 2006.

## **Japanese Red Cross Medical Center**

Existing facility was completed in 1975. The facility includes a hospital, a nursing college, health-care facilities and dormitory for nursing personnel. After thirty years the facility becomes old enough to rebuild the new one, from the medical viewpoint and the viewpoints of indoor environment, energy performance and global warming index based on CO2 exhaustion.

The owner recognized the importance of design of energy plant from the lifecycle point of view, together with the HVAC performance management with the help of initial commissioning process. The author had a chance to present on how an optimal energy and HVAC system performance could be attained and how the commissioning process could help to arrive at the final goal of the Red Cross through it. This would be the biggest project the BSCxA could imagine for the moment, and after finalizing it, vast amount of valuable experience and model quality process for commissioning would sum up to provide BSCxA members for their new business chance. The author submitted a draft proposal document of commissioning process, for which several references such as PECCI Model Commissioning and Guide Specifications, ASHRAE 2005 Guideline and the Building Commissioning Handbook of BCA.

As the project is now on the edge of the beginning of design development step, here is only introduced the rough figure of facility and what the author and his staff, have done.

- Total floor area: 81,700, hospital
- Number of floor: 12 and B3
- Provisional completion: September, 2009
- Energy plant load includes nursing college and health-care facilities

In this project, competition on the district development had been done and the design professional was already decided, preliminary design was going on when the CxA, the author, joined the project. The process that has been managed until now and for the near future is as follows.

- 1) BSCxA contracts for commissioning process: Nov.1, 2005
- 2) Issued Owner's Program on behalf of the owner: Dec.18
- 3) Review Preliminary design: Nov.22
- 4) OPR workshop: Dec.12
- 5) Issued OPR on behalf of the owner: Jan. 11
- 6) Issued commissioning plan, program phase: Jan. 11
- 7) Energy system simulation by CxA: February to March

Generally speaking, OPR issue is enough for the CxA to show the system option available, however in this case, the owner sincerely wanted CxA to evaluate and indicate the design guideline to the design professional which system should be selected, or, available as candidates. The last item was thus assigned to the CxA task and has been preparing available simulation programs as effective.

## **International Activities on Building Commissioning**

### ***Participation to NCBC***

Though the author has not sufficiently surveyed, participation from Japan to NCBC is continual since 2001 when he first participated the conference with twenty-three other members. Members visited LBNL and TAM before arriving in Cherry-Hills where they met people who had welcomed us in their own facilities and knew that NCBC is a wonderful place to those who are interested in building commissioning. Through the SHASE committee network the author has suggested to submit papers or even of just participation to the conference. In 2004 another mission focusing on commissioning visited again when the author could converse with Dr. Chad Dorgan and Dr. Michael Weiss, the former president of BCA, who kindly extended international cooperation. Topics on qualification programs in five organizations for commissioning engineer including commissioning authority were very educative to me.

At the 2005 conference, Mr. Kazuo Watanabe participated in both NCBC and BCA general meeting as a private delegate from BSCxA and could exchange opinion between. He was so impressed with the activity of BCA that he introduced several topics in a series to BSCxA Newsletter including qualification and education program for commissioning authority. My participation to the present conference is due to an obligatory sense to report the latest state of art in Japan.

### ***IEA / Annex 40 and 47***

Annex 40 work has been already mentioned above and two reports was made by Ms. Natascha Castro and the author in NCBC 2004 [2][3]. The MQC, Model Quality Control matrix for managing commissioning process and data base is being used for commissioning management of above-mentioned Red Cross Medical Center.

Annex 47 is now on the way the title of which is “Cost-effective Commissioning for Existing and Low Energy Buildings,” for which Natascha Castro from NIST, USA and Daniel Choinière from CxANMET, Canada are the Co-Operating Agents. Ms. Castro is expected to introduce the detail of the project in this conference. Prof. Harunori Yoshida is the chairman of Japan shadow meeting for Annex 47.

### ***APCBC and HKCxC***

Concerning the Asian state on commissioning [4], HKCxC, Hong Kong Building Commissioning Center, was established in December, 2004, affiliated with the Hong Kong Institute of Vocational Education and with short- to long-term training programs show to propagate the process and bring up commissioning engineers. In Mainland China and Korea the commissioning process is not well recognized yet except in a sense of performance diagnostics and fault detections.

The APCBC’s idea has been discussed with Mr. Leo CF Wong, a member of HKCxC. The kick-off of APCBC, Asia Pacific Conference on Building Commissioning will be done at the ICEBO conference in Shenzhen, China, in November 6-8, 2006. The ICEBO, International Conference on Enhanced Building Operation, has been held together with the fall meeting of IEA / Annex 40 since 2003 in LBNL, Berkeley. The 2006 meeting will be held with Annex 47 together, and also co-sponsored by the China Association of Architectural Thermal Energy and Power Engineers.

Several international associations are to support the conference, including the author's NPO BSCxA in the name of cooperating conference APCBC.

The author as a promoter of APCBC sincerely wishes to keep some link with NCBC and asks its supporting organization PECCI, BCA, etc. for collaboration.

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