

SOLUTIONS FOR THE FRONT ELEVATION ARRANGEMENT OF PUBLIC BUILDINGS UNDER THE IMPACT OF AIR-CONDITIONING SYSTEMS AT THE CENTER OF THAI NGUYEN CITY

Ngô Thị Thu Huyền*

University of Technology – TNU

SUMMARY

Public buildings are always invested in aesthetic qualities, built on the main roads of the city, could help to form the civilized and modern face of the city. However, the aesthetic qualities of the front elevation arrangement are deteriorated by the equipment used in the interior, typically local air conditioners, which have not yet been managed in the focus of urban landscape architecture. This phenomenon occurs throughout the provinces, cities, the scope of this article only mentioned and surveyed in the center of Thai Nguyen city. The problem to be solved is the behavior of front elevation arrangement under the changing of human's demand in controlling microclimate in these buildings by air conditioning systems. It is very necessary to find a solution for solving these problems in order to complete functions for these buildings. The research results of this article are significant in enhancing the urban management, preserving the landscape architecture of the main streets, improving the functions, the aesthetic qualities and values for using buildings.

Keywords: *plan of urban development, civil architecture, public architecture, integrated architecture, air conditioning system*

INTRODUCTION

Public Buildings (PB) are very important in shaping urban landscape architecture by the front elevation arrangement or the blocks of the buildings. Particularly, due to the generousities and high artistic requirements of PB, their locations and aesthetic qualities are influenced in the meaning of the direct and main on the faces of any city in the world. Some special buildings are also considered as symbols of the city or country because of the artistic value of the architecture that the building has achieved. Examples include New York's "Liberty Statue", Sydney's "Opera House", Paris's "Eiffel Tower" ...

It is easy to see that the face of the city is constantly changing. Thai Nguyen City is also changing day by day, so that every day, we see some new corners in the urban landscape on the rise. Each building not only meet the requirements of operation, durability, economy, aesthetic value, to facilitate the work environment more comfortable, the building have been equipped with additional

electrical equipments to control and to air conditioning. Special equipment used is the Air Conditioning Systems (ACS). However, during the renovation and new design, many of the buildings did not notice the impact of the equipment in the ACS on the exterior surface of these buildings [1,2,3].

In the "Urban Design" of the Vietnam Construction Standards [4] they are showed very specific in terms of height, race distances from the building are compared with to the boundaries in construction. In the regulation on urban planning and architecture of Thai Nguyen city complies with the national regulations, applying local practical characteristics also stipulates the principle of space layout of architecture or/and landscape "[5]. On the basis of regulations on urban architecture management and construction practice in Thai Nguyen, we find that the influences of air conditioning devices - details not in design - greatly affect the aesthetic values, but no measures, regulations to limit those effects.

This article deals with the fact that most of the architectural buildings is the arbitrary

*Tel: 0904 388535, Email: cunvin@gmail.com

arrangement of the ACS. This worsens the house's front elevation surface, adversely affecting the aesthetic qualities of the front elevation. For the purpose of improving urban aesthetics, in accordance with the state regulations on urban construction, this paper will analyze the current situation of the installation of ACS in the center of Thai Nguyen city. This paper would propose some solutions to organize the front elevation arrangement of the PB in order to limit and overcome the effect of the ACS on the front plan buildings.

SURVEY AND ANALYSIS OF SOME PUBLIC BUILDINGS AFFECTED BY THE ACS TO THEIR FRONT ELEVATION IN THE CENTER OF THAI NGUYEN CITY

The author surveyed the main roads of Hoang Van Thu, Bac Son, Minh Cau and Doi Can in the center of Thai Nguyen city to examine the effects of the ACS, namely, the mounting of hot part of an air conditioner is attached on the front elevation surface of the typical architectural buildings.



Figure 1. *Thai Nguyen Social Insurance Building*
Thai Nguyen Social Insurance Building is located on the Hoang Van Thu street, the largest administrative center in Thai Nguyen

province, which was completed in 2003. The building is formed by its light, clean architectural structure. However, over time and under the needs of the people, the building also add to the main front elevation with many unattractive blocks of air conditioning systems.

Minh Cau II Service and Trade Building is located on Minh Cau street was built with a 6-year operating time with modern architecture, but the front elevation drawing has broken the architectural image in the original design because these equipments have reduced the aesthetics of the building.



Figure 2. *Minh Cau II service and trade building*
DPA Kindergarten is located on the new road Bac Son, designed with a rhetorical architecture, simple, gentle. As a private kindergarten that goes into the high quality of teaching and child care, facilities and equipments must meet the requirements. So that the installation of air conditioning systems is setup in order to keep the classroom temperature to be steady in both summer and winter must be necessary. That is why has led to the front elevation of the building has been suspended by the air conditioning systems.



Figure 3. DPA Kindergarten of Thai Nguyen City



Figure 4. Thai Nguyen Provincial Youth Union

Thai Nguyen Provincial Youth Union, which was built in Doi Can district, was used into operation in 2015 with the rear elevation is mounted by a lot of air conditioning systems. Along with this building and other newly completed buildings in Thai Nguyen such as Dong A Plaza, Viettel Building ... are also aware of keeping the front elevation to be clean, the ACS have been installed on the rear elevation surface. However, this is only a temporary solution because the installation of air conditioning is very complex, caused by

the length of the gas path connecting the hot part and cold part of the air conditioning system has limited. This length of performance and efficiency is only about 3-7m [6]. The figure 5 depict this principle.

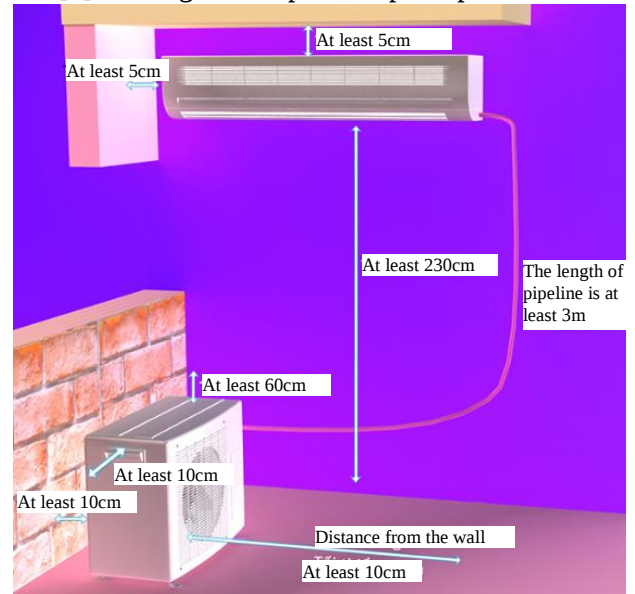


Figure 5. The location of the hot part of an ACS

SOME DIRECTIONS OF SOLUTIONS TO ARRANGE THE FRONT ELEVATION OF PUBLIC BUILDINGS IN ORDER TO IMPROVE AND RE-DECORATE NO BE AFFECTED BY THE ACS

When improving and re-decorating the face of the urban settlement on the front elevation surface of the architecture is the most obvious. Especially, the PB will be given priority to the beautiful and spacious locations which need to be paid more attention in the process of renovation and new construction. However, the position of the hot part of each air-conditioning unit installed is subject to technical requirements to ensure longevity, safety and economy for the user. This is the design data required during the period of a building design. In the article "How to position the hot air conditioning unit to the best of a machine" [6] of the DaiKin Group strongly recommended, shown in detail the specifications in (Figure 5). Pursuant to this rule, the hot part of an air conditioner must be located to the outside of an apartment, which

will appear on the home's face, which is why we have to face and have to deal with it.

Combined reality and design principles, technical requirements of the ACS, some solutions are given as follows:

Using the central air conditioning system:

The best way to overcome the effect of air conditioning on the front elevation is instead of using location of air-conditioning by using central air conditioning. With central air conditioning, only hot unit can be connected to multiple indoor air conditioners. The current hot units are also much more compact, usually located on the roof. However, it is only reasonable for large projects, requiring space to be air-conditioned and accompanied by high costs, complex maintenance and repairs.

For buildings using the local ACS:

Existing buildings

The existing buildings are equipped with ACS needs to design the place of hot unit to respect the existing aesthetic value of these buildings, select the hidden corner created by architectural details, such as the side of the block stairs protruding from the front

elevation, balconies ...Or create new architectural details on the front elevation based on the appropriateness of the old and the new details in a harmonious way, in order to shield these devices. In this case, the use of opening shields will create the necessary shielding, while easily merging with the existing works. We need to study the position need to install air conditioner, the design forms array in horizontal, in vertical direction on the surface to easily shield as the plate of iron, wood, plastic... In case of suitable color, denseness, size of nanoscale against the total surface of the building (Fig. 6b, 6c);

For the buildings will be constructed newly

New buildings need to contribute positively at the design stage, architects need to add structural components to accommodate the hot part of the air conditioner, or integrate the function for the external parts. That takes on the role of skilfully covering those devices. Especially, in the world, the trend of design in the integrated style that an architectural detail will take on many functions that are very interested.

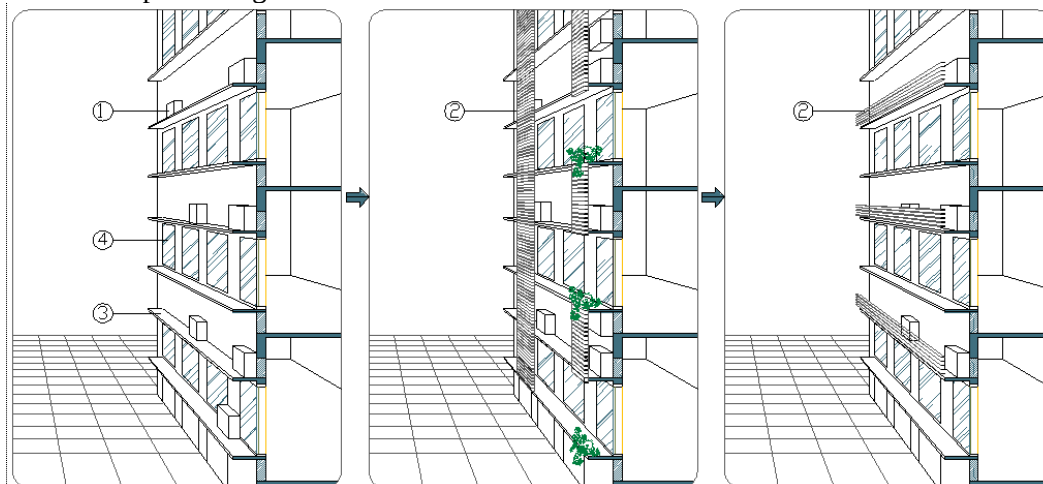


Figure 6. Corner plan to elevation layout of the PB with windows

1. The hot part of an ACS; 2. Shield; 3. Umbrella window; 4. Window

a) Corner of the original works

b) Arrange the hot part of ACS behind the lattice along the house, combining sunblind and decorative

c) Arrange the hot part of ACS behind the array of horizontal layout

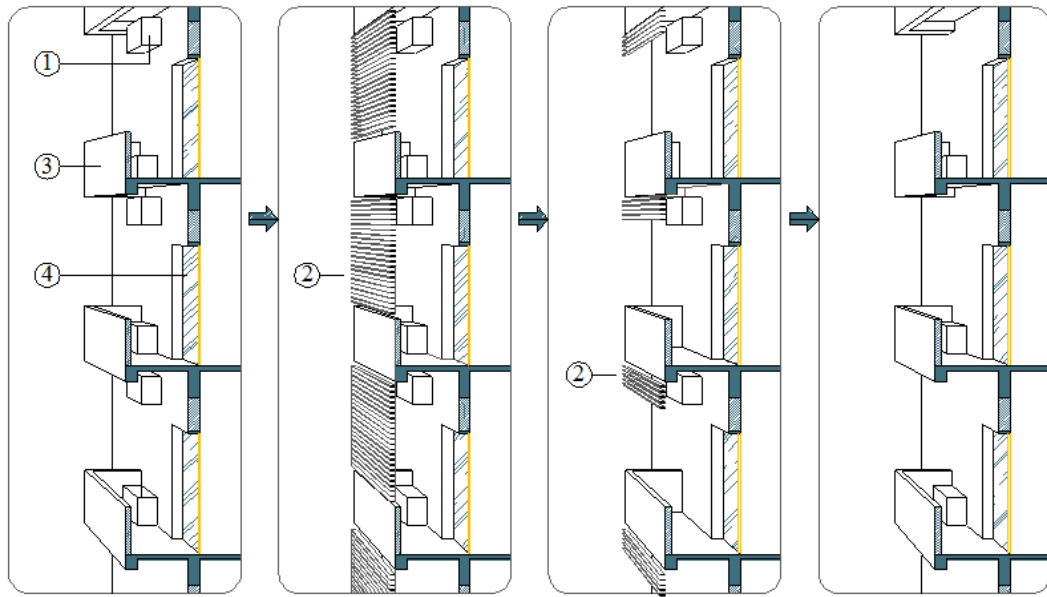


Figure 7. Corner plan to elevation layout of the PB with balconies, loggia.

1. The hot part of an ACS; 2. Shield; 3. Umbrella window; 4. Window

(a) Corner of the original works

(b) Shield arrange longitudinal sunblinds and the hot of ACS

(c) Shield arrange longitudinal sunblinds and the hot of ACS when they are mounted under the balconies

(d) The balcony design is large enough for the layout of the door to travel and set the hot part of ACS

For example, the escape ladder of a public building, which is made by the steel structure and attaches to the outside of the house, will be both a structure for the installation and protection of the hot part of an air conditioner; Shields for sunlight and rainwater to the windows can also be used to cover the supporting task, in combination with the cover plates for arranging the hot part of an ACS (figure 7c); The space of the balcony, loggia is also the location to place the hot part of an ACS is appropriate if it is designed to have width and depth to ensure the air conditioning device without affecting the organization of travel space (Figure 7d); Or, the shelves placed in the window pots are also designed to be mounted on a hot cushion underneath, combining the surrounding shield to cover the air conditioning unit, as well as decorating the hanging basin on the elevation (Figure 7b); Sunshades for windows, doors on the balcony floor will also shield the air conditioning systems suspended near the ceiling... (Figure 7c).

The design-integrated trend will be a new design task for architects to create and solve new problems in design.

Urban management of the authorities

The urban management regulations of Thai Nguyen city specifically stipulate the requirements for the urban public buildings, but they stop at the fixed parts of the project and. It is necessary to study and add provisions for detailed parts and equipment organized not in the original structure of the works. The contents of approved documents and files if they will be used at the site should add under the reviewed responsibilities of investors, design and construction tenders and urban management. Those tasks are very important in order to setup additionally the ACS must be assigned by the regulations and rules, so that the landscape of the roads and streets will be more comprehensive beauty and not breaking the original scenes.

CONCLUSIONS

The development of science and technology helps to create modern equipments for

completing architectural buildings. This is an indispensable contribution to architectural works to serve better with the human activities organized in them. If it only stops at the performance of the device but ignores its effect on the image of the building, it is actually an incomplete development. Therefore, we need to study and propose solutions to harmonize the factors in order to contribute to architectural works always to be beautiful forever. With examples and analysis of some old and new works in Thai Nguyen city, it is clear that the impact of the ACS on the PB has not been paid enough attention, the image will be increasingly bad due to the development of city.

REFERENCES

1. GS.TS Nguyễn Thế Bá (2007), *Quy hoạch xây dựng phát triển đô thị*, Nxb Xây Dựng, Hà Nội.
2. Đặng Thị Phúc Tiên, Đỗ Thị Minh Phúc (2008), *Giáo trình Thiết kế kiến trúc nhà dân dụng*, Nxb Xây Dựng, Hà Nội.
3. PGS.TS Nguyễn Đức Thiềm (2007), *Nhà ở và nhà công cộng*, Nxb Khoa học và Kỹ thuật, Hà Nội.
4. Bộ Xây Dựng (2008), *Quy chuẩn xây dựng Việt nam về Quy hoạch đô thị*, QCVN 01:2008/BXD.
5. UBND TP Thái Nguyên (2012), *Quy định quản lý đô thị của thành phố Thái Nguyên* 2015
6. Công ty THHH Thương mại và Kỹ thuật Bắc Việt(2017), *Vị trí lắp đặt các nông điều hòa như thế nào tốt nhất cho máy*, truy cập tại trang <https://daikinbacviet.vn/goc-tu-van/vi-tri-lap-dat-cuc-nong-dieu-hoa-nhu-nao-tot-nhat-cho-may/>, truy cập ngày 23/1/2018.

SUMMARY

GIẢI PHÁP TỔ CHỨC MẶT ĐỨNG CÔNG TRÌNH CÔNG CỘNG TRƯỚC ẢNH HƯỞNG CỦA HỆ THỐNG ĐIỀU HÒA KHÔNG KHÍ TẠI TRUNG TÂM THÀNH PHỐ THÁI NGUYÊN

Ngô Thị Thu Huyền*

Trường Đại học Kỹ thuật Công nghiệp – ĐH Thái Nguyên

Công trình công cộng luôn được đầu tư về chất lượng thẩm mỹ, được xây dựng trên trục đường chính của thành phố, giúp hình thành lên bộ mặt văn minh, hiện đại của đô thị. Tuy nhiên chất lượng thẩm mỹ trên mặt đứng công trình lại bị làm xấu đi bởi thiết bị phục vụ cho con người bên trong nhà, điển hình là hệ điều hòa không khí cục bộ, một vấn đề hiện nay chưa được đưa vào quản lý kiến trúc cảnh quan đô thị. Hiện tượng này diễn ra trên khắp các tỉnh, thành phố, phạm vi bài viết này chỉ đề cập và khảo sát thực tiễn tại trung tâm thành phố Thái Nguyên. Vấn đề đưa ra để giải quyết là ứng xử của tổ chức mặt đứng công trình trước sự thay đổi về nhu cầu sử dụng của con người trong việc kiểm soát vi khí hậu trong nhà bằng hệ thống điều hòa không khí, tìm kiếm giải pháp thiết kế khắc phục, hoàn thiện được chức năng cho công trình. Kết quả nghiên cứu của bài báo có ý nghĩa trong việc nâng cao công tác quản lý đô thị, giữ gìn kiến trúc cảnh quan các tuyến phố; hoàn thiện công năng, nâng cao chất lượng thẩm mỹ và giá trị sử dụng cho công trình.

Từ khóa: *quy hoạch xây dựng phát triển đô thị, kiến trúc dân dụng, kiến trúc công cộng, kiến trúc tích hợp công năng, hệ thống điều hòa không khí*

Ngày nhận bài: 22/5/2018; Ngày phản biện: 25/5/2018; Ngày duyệt đăng: 31/5/2018

* Tel: 0904 388535, Email: cunvin@gmail.com