

ARCHITECTURE AT THE END OF THE 20<sup>th</sup> CENTURY

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## Summary

*The last decades of the last century were characterized by economic prosperity, at least until the 60s, when economic prosperity was briefly interrupted by energy crises. Architecture ceased to be restricted to a handful of building types. The increased variety and complexity of functions within and around buildings called for new structural and architectural solutions. The early modern style was grounded on rationalism and it intended to break with the historical precedents, many architects became convinced of their ability to solve most social problems by architectural means. Gradually, from modernism and from its derivatives, such as brutalism, functionalism and structuralism, a new and different type of architecture evolved.*

*In the 20<sup>th</sup> century progress, continued to advance at a frantic pace, especially in industry; increased urbanization followed and with it the concentration of labor in cities, a trend which has continued right up to the present time. During the period 1960-2000 housing became a mass affair to the point when tens of millions of families could move into well-equipped homes. However, an improvement in world housing conditions and city life remains a task for the twenty-first century. Modernism, undoubtedly, achieved great technical progress in building but by the end of the modernist period (around the 1960s) disenchantment with it had set in strongly. This in turn led to post-modernism which gradually spread throughout the world.*

*The complex problem of ecology and methods to apply these concepts to the process of designing buildings is of an extreme importance for our profession and the education of future architects. As the use of building materials continued to evolve together with demands for comfort and better hygiene, the form of building changed: they became more open. The development of building forms in hot climate zones was quite different. The tendency in those areas was to locate living areas underground to utilize the coolness of the earth and to create ventilation through buoyancy, thus improving thermal comfort. New schools of architecture, regional developments, or vernacular architecture will spread new approaches, ideas, technologies or materials in order to enrich the already highly diverse faces of contemporary architecture.*

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## 1. INTRODUCTION

The last decades of the last century were characterized by economic prosperity at least until the 60s. The arms race between the superpowers extended into space, stimulating high-technology industries such as electronics, communications, as well as the more traditional ones: the metal, glass and chemical industries.

Innovations and inventions in armament and space research quickly found their way into everyday civilian use, and this applied to the building industry too. Economic prosperity was briefly interrupted by increased oil prices. The energy crisis of the 70s spurred Western economies into devising new solutions for the reduction of energy use, for example by adopting higher standards of thermal insulation and by developing new technologies and discover many materials.

Architecture ceased to be restricted to a handful of building types. The increased variety and complexity of functions within and around buildings called for new structural and architectural solutions. Moreover, the construction of high-speed railways and the new facilities of air transport were of greater complexity than was traditionally the case. This, together with the general increase in the size of buildings and structures, led to the use of greatly increased spans. Therefore, any treatise on architecture must cover a much broader range than was the case in earlier periods.

## 2. ARCHITECTURAL “MACHINERY”

The notion that buildings equipped with a multitude of modern services could serve as machines was first raised in the 1920s. It was Le Corbusier who famously said that a house is a machine for living in. This was a statement that did not find universal favor. Frank Lloyd Wright vented his sarcastic disagreement: “Yeah, just like a human heart is a suction pump”. It was only later in the “high-tech” post-modern period that the idea was materialized in a very sophisticated way.

The early modern style was grounded on rationalism and it intended to break with the historical precedents. Fired by a new aesthetic vision, many architects became convinced of their ability to solve most social problems by architectural means. However, disappointment with modernism soon arose in the recognition of the failure to construct cities with an adequate quality of life (Jacobs). Many felt that a fresh start was required, which could contribute to urban renewal. Just to mention one of the similar statements about this development: “The revolutionary ideal of solving societal problems through design that was so vehemently proclaimed by modernism’s proponents in the heroic age of the 1930s was exposed as hollow”. Gradually, from modernism and from its derivatives,



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such as brutalism, functionalism and structuralism, a new and different type of architecture evolved with some practitioners and theoreticians accepting and others rejecting the post-modern label (Koolhaas, Jodidio).

The 1960s introduced new-thinking, which gradually developed into post-modern trend. The last 40 years of the century saw how post-modernism it self became spent and began to make way for new architecture, sometimes called super-modernism. New functions of buildings and the concentration of different functions in single versatile and flexible buildings required new building designs. New architecture does far more than simply retain and renew the achievements of the past's architecture; it also applies new principles.

These embrace new architectural and structural schemes, the satisfaction of new functional requirements and the use of modern construction and design technologies. Some of these are the new materials (reinforced concrete, metals, glass, plastics), tensioned structures (tents have been built since ancient times but their modern variants offer entirely new possibilities) long-span roofs over large spaces, retractable roofs, deployable structures, atria and many others. In certain types of buildings (hotels, offices) high atria have been introduced. Whilst some architects were prepared to see the post-modern style as a logical development of modernism, many considered that the new style was a reaction to the latter's impersonality. According to Jencks: "The main motivation for Post-modern architecture is obviously the social failure of modern architecture (Jencks, 1966) and Post-modern is a *portmanteau* concept covering several approaches to architecture which have evolved from modernism. As the hybrid term suggests, its architects are still influenced by modernism... and yet they added other languages to it. A Post-modern building is doubly coded – part Modern and part something else: vernacular revivalist, local, commercial, metaphorical, or contextual". (Jencks, 1988)

Indeed the post-modernism style favored the use of decoration, symbolism, humor and even mysticism. Unlike those favoring pastiche out of nostalgia for the past, the proponents of post-modernism were prepared to avail themselves of the use of up-to-date technology, as well as traditional materials. In this they recognized that technology affected architecture both in form and function

The new "machinery" represents a joyful possibility for architects to use their imagination, creating a diversity of spaces. For example, in the skyscraper "The Commerzbank Building", Frankfurt, designed by Sir Norman Foster and Partners, the planned three-storey winter gardens spiraling around the building, became four-storey, while the double-leaf facade became single-leaf. Another fundamental change was to integrate the elevator areas in the service cores, which had previously been annexed in the 'fish rail'. However, the basic idea remains unchanged.



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In pursuit of improved infrastructures for urban areas, designs with atria, malls and light wells, are enjoying a revival. The architecture of the late 70's and early 80's rediscovered the special features of rooms under glass and their versatility as meeting places, lobbies, climate buildings, modifiers of the microclimate, noise protectors, etc. depending upon the specific requirements, different solutions present themselves for servicing these projects.

### 3. ECOLOGICAL APPROACHES

As the use of building materials continued to evolve together with demands for comfort and better hygiene, the form of building changed: they became more open.

Contrast to these examples of buildings in temperate zones, the development of building forms in hot climate zones was quite different. The tendency in those areas was to locate living areas underground to utilize the coolness of the earth and to create ventilation through buoyancy, thus improving thermal comfort. Until a few hundred years ago, the relationship between human beings and their environment was characterized by their willingness to adapt to the environment and to live in harmony with it.

The comfort requirements were very different in the past and cannot be compared to today's demands, since people were unable to tame nature to the degree to which it is possible now. The global population was much smaller and groups had ample space, finding in nature all they need for survival. The small windows units allowed little daylight to penetrate into rooms. The main function of windows was to provide visual contact with the outside world. Small windows also resulted in minimal heat gains from the outside to the inside, and therefore in minimal cooling loads. In winter, these small windows created only insignificant heat losers and the heating requirements for rooms in the buildings were generally no higher than they are in modern, well-insulated buildings.

In the 20<sup>th</sup> century progress, continued to advance at a frantic pace, especially in industry; increased urbanization followed and with it the concentration of labour in cities, a trend which has continued right up to the present time and has triggered the tendencies of the post-industrial age with which are all too familiar. 'Less is more' is the motto for all future buildings with regard to ecological demands. Past and modern designs as well as state-of-the materials and technologies should be adopted to minimize energy demand and thus actively protect the environment. The complex problem of ecology and methods to apply these concepts to the process of designing buildings is of an extreme importance for our profession and the education of future architects.



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The technology of ecological building has a sense of integrated planning: global prognoses and ecological cycles help to formulate guidelines for buildings in the future, standards that must be observed if we are to guard against environmental crises. We need high technology in order to integrate the supply of water, heat, cooling, electricity, natural ventilation and lighting into the buildings structures to be design from the start of the processes and to contribute, to the protection of natural resources by utilizing solar energy and rainwater, geothermal and other thermal systems, to name but a few.

More and more clients and investors recognize the need for architectural innovation that will render buildings less vulnerable to crises. Ecological building means applying technical aids sparingly and making the most of all passive means provided by the building's fabric. Here, developments in structural engineering and construction in urban areas, building form and orientation, play important roles. To help better understand certain climatic, aero physical and technical processes and function, the basic principles of these fields are made easily accessible, laying a foundation of information with which to begin drafting new designs.

The measures employed in ecological building are complex and derive from several specialized disciplines - from urban planning, architecture, construction and facade design to active technical building services and their applications. Planted surfaces, indoor and outdoor, fresh air, soil, water and rainwater, all contribute to an integrated design, as does the management of building services and utilities that use the abundant resources of the environment.

Few architects, construction engineers and building services engineers are truly able to deal with these issues; their training has usually not prepared them for this kind of approaches. Very important are the local climate influences by focusing on design, orientation and locations and glazing aspects, as well as integrating planted surfaces, terraces, and shading elements into the design of his buildings.

Developments in efficient heating and air-conditioning services opened up the possibilities of maintaining climatic comfort in large spaces, which were covered, or enclosed by a thin, often glazed envelope of minimal thermal inertia. Consequently, historical solutions, such as the tent or atrium, could be revived in a new context and with the use of new materials and technology. The atrium with glazed roof became a favourite feature of many office, hotel and shopping developments. Relatively recent concepts are sustainability, protection of the environment and energy conservation, all, of which have influenced architectural thinking. Sustainability, in its most general meaning, refers to strategies in the present that do not harm or endanger future life. Various factors contribute to the design of sustainable buildings, which are also referred to as "green buildings". These factors, among others, include attention to energy-conservation and HVAC



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(heating, ventilation, air-conditioning) control, thermal storage and land conservation.

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#### 4. CONCLUSIONS

The “new architecture” makes use of new geometric and amorphous shapes, new concepts and proportions, measure, colour, lighting and technological aspects. Some new non- technological factors, coming from the latest of science and social development, also affect new architecture. The original ideals of modernism were characterized by Jencks:” Modern architecture is the overpowering faith in industrial progression and its translation into the pure, while International Style (or at least the Machine Aesthetics) [has] the goal of transforming society both in its sensibility and social make-up” (Jencks, 1996).

Modernism, undoubtedly, achieved great technical progress in building but by the end of the modernist period (around the 1960s) disenchantment with it had set in strongly. This in turn led to post-modernism which gradually spread throughout the world. The speed with which functions, requirements and technology are changing as called for flexibility and adaptability in buildings design.

Returning to the socio-political events, the most momentous of these in the late 1980s was the collapse of the communist system in Eastern Europe, and with this, the end of the centrally planned economy and ideological constraints. However, from the point of view of architecture, the most far-reaching consequences of the event lay in economics. The event assisted the acceleration of the globalize economy, the penetration of multinational companies into new industries and, the rapid growth of commerce, technology, or corporate identity. Globalization affects also architecture and construction, but globalization as an overall trend in society is still very much a matter of debate.

Great progress has been achieved in long-span building roofs: tensioned table roofs, etc. From the imposing number of new cultural buildings, perhaps the Bilbao Guggenheim Museum (architect: Frank O. Gehry, completed in 1998) may best be characterized as containing the most up-to-date design features: a cladding made from thin titanium sheet, designed by computer program borrowed from aircrafts CAD. Future building design and development must take into consideration the dependencies illustrated in the ecological circle [3, pg.118] has to



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identify the crucial topics, such as exterior space, structural fabric and technology and their respective subtopics.

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