Architecture of Workplaces 1. Lecture 4

Questions of today and challenges of the future
INDUSTRY 3.0 – automation. Space and structure: big, "smart", economic. Halls
Questions of technology and spatial flexibility.

6. The Marshall Plan (officially the European Recovery Program, ERP) was an American initiative passed in 1948 for foreign aid to Western Europe. The United States transferred over $12 billion (equivalent to $130 billion in 2019) in economic recovery programs to Western European economies after the end of World War II. Replacing an earlier proposal for a Morgenthau Plan, it operated for four years beginning on April 3, 1948. The goals of the United States were to rebuild war-torn regions, remove trade barriers, modernize industry, improve European prosperity, and prevent the spread of communism. The Marshall Plan required a reduction of interstate barriers, a dropping of many regulations, and encouraged an increase in productivity, as well as the adoption of modern business procedures.
The European Coal and Steel Community (ECSC) was an organisation of six European countries created after World War II to regulate their industrial production under a centralised authority. It was formally established in 1951 by the Treaty of Paris, signed by Belgium, France, Italy, Luxembourg, the Netherlands, and West Germany. The ECSC was the first international organisation to be based on the principles of supranationalism, and started the process of formal integration which ultimately led to the European Union.
The ECSC stood as a model for the communities set up after it by the Treaty of Rome in 1957, the European Economic Community and European Atomic Energy Community, with whom it shared its membership and some institutions. The 1967 Merger (Brussels) Treaty led all of ECSC's institutions to merge into the European Economic Community, but the ECSC retained its own independent legal personality. In 2002, the Treaty of Paris expired and the ECSC ceased to exist in any form, its activities fully absorbed by the European Community under the framework of the Amsterdam and Nice treaties.

7-8. Cold War, the open yet restricted rivalry that developed after World War II between the United States and the Soviet Union and their respective allies. The Cold War was waged on political, economic, and propaganda fronts and had only limited recourse to weapons. The term was first used by the English writer George Orwell in an article published in 1945 to refer to what he predicted would be a nuclear stalemate between "two or three monstrous super-states, each possessed of a weapon by which millions of people can be wiped out in a few seconds."3. World War II affected the way industrial buildings were designed. At first buildings were **rushed up** everywhere to meet the demand of armaments and equipment supply. Many especially factories were **converted to differing uses**, from cars to ambulances, from textiles to mortar bombs, their pre-war **flexible designs** allowing this change of operations. In The UK, demand for essential materials in the war effort encouraged the use of **quickly constructed buildings, using lightweight steel structural elements**, asbestos-cement cladding and with north light roofing, often "blacked out" or painted in camouflage. These **corrugated asbestos-clad factories** set the scene of many industrial estates for decades beyond.

13. Quickly constructed buildings, using lightweight steel structural elements, panel cladding.
Economics and necessity meant that **lightweight pre-stressed reinforced concrete and the new use of laminated timber** for columns and roof structures came in. Newly developed **resin glues and synthetic materials** joined these materials in the goal of finding alternatives to traditional materials.

14-15. A structural engineer who was mainly involved in **industrialized building**, working with a variety of materials; reinforced concrete, aluminium, steel...
The „Shed-roof type" enabled wide span halls and the natural light of huge, uninterrupted production surfaces. However surface structures of reinforced concrete didn't became wide-spread because of great demand of formwork.

16. A process became dominant in machine production, car factory or electrical engineering; **to assamble the end products from series produced building elements**. This way it is possible to make the single elements correspond the changing circumstances.

17-20. His aim was to take over **methods of the car-body production to construction process**. The single construction elements were designed considering static aspects, and used for the most different purposes. In the thirties he developed a system for series production of curtain walls made of prefabricated steel or aluminium sheets, but also building elements for load-bearing and installations. He built several houses, schools, canteens, laboratories using these **prefabricated elements**.

21-22. Lever house – the first type of modern office/administrative building: high-rise, vertical part with offices, everything else in the horizontal part.
A glass-box skyscraper built in the International style according to the design principles of Ludwig Mies van der Rohe.
Steel frame with high levels of glazing, their streamlined aesthetic derived from the work of Mies van der Rohe . In the USA, the firm of Skidmore, Owings and Merrill took up this new "cool box" style.

24-28. It was designed by Mies van der Rohe, in collaboration with Philip Johnson. The building has 38 stories, and was completed in 1958. It stands as one of the finest examples of the **functionalist aesthetic** and a masterpiece of corporate modernism.
This structure, and the International style in which it was built, had enormous influences on American architecture. One of the style's characteristic traits was **to express** or articulate **the structure of buildings externally**. Mies thought that **the building's structural elements should be visible**, more honestly converse with the public than any system of applied ornamentation. The Seagram Building, like virtually all large buildings of the time, was built of a **steel frame**, from which non-structural glass walls were hung. Mies would have preferred the steel frame to be visible to all; however, American building codes required that **all structural steel be covered in a fireproof material, usually concrete**, because improperly protected steel columns or beams may soften and fail in confined fires. For fire protection he used **non-structural bronze-toned I-beams to suggest structure instead**. These are visible from the outside of the building, and run vertically, like mullions, surrounding the large glass windows. This method of construction using an **interior reinforced concrete shell to support a larger non-structural edifice has since become commonplace**. As designed, the building used 1,500 tons of bronze in its construction.

30-33. The MetLife Building is a 59-story skyscraper at 200 Park Avenue at East 45th Street above Grand Central Terminal in Midtown Manhattan, New York City. Built in 1963 as the Pan Am Building, the then-headquarters of Pan American World Airways, it was designed by Emery Roth & Sons, Pietro Belluschi and Walter Gropius in the International style.
The floors of the Pan Am Building were constructed in a manner similar to how bridge spans were built. The builders used a process called composite action, in which concrete was bonded with structural steel panels to create a stronger structure. The tower's structural steel topped out in May 1962.
The building is an example of International Style modernism in architecture derived, also called brutalism. His silver is octagonal and is characterized by open floor plans and the absence of luxurious details both inside and outside.
Although it has been since its construction skyscraper one of the most detested by the public of New York, this gigantic tower has always been very popular among the tenants who occupy it for its convenience and location. The interior of the building is occupied almost entirely by offices of the insurance company MetLife and other mostly smaller companies.
Historically this building was erected at a time when major companies wanted larger plants for their offices and thereby minimize the discomfort of having to join several floors. The surfaces in this skyscraper are several times larger than the nearest Chrysler Building, for example, and one could argue that the form of this **building is one of the most successful of the great skyscrapers** of his generation.
A third of its north-south facade has a slight bend backwards decreases the mass of skyscrapers from many points of view, increasing their sangria with widely spaced colonnades hiding the two main technical plants and break the monotony of the great facade in a novel way. With the same purpose has been created in the north and south facades a dark band below the flat roof that provides a better basis for the placement of logos, being a Modernista attempt at a “ledge” figuratively.

34-36. The Center of New Industries and Technologies, better known as CNIT, is one of the first buildings built in La Défense. Its bold design stunned the world and its vault with a height of 50m built on an equilateral triangle of side 218m could have covered the Place de la Concorde, in Paris. The call by press time ”century work ” was conducted by three architects awarded the Rome Prize, Robert Camelot, Jean de Mailly and Bernard Zehrfuss.
Originally conceived as an exhibition center for tools and machinery industry French, the building.
The building stands out as the largest enclosed space, built under a concrete deck without any support. It is one of the most striking buildings of modern architecture, built of reinforced concrete, with an innovative double-shell design with internal ribs. The triangular structure is based on three points that are 218m (217.93 m) of distance between them. The center of the roof rises over 46m above the ground on the inside. The impressive vaulted ceiling is completely free and clear of columns or beams and raised inside spaces do not provide any structural support, offering more the appearance of being hung from own vain.
Glass lifts or side facades are held by sections of very thin stainless steel. These elevations designed by Jean Prouvé, were classified as a historic monument was renovated and restored when the CNIT, in 1989.

37. Buckminster Fuller was an autodidact, his constructions came about mostly from experiments.

38. In 1927 he designed a „living machine”, a construction of technical equipment and living zones. The „Dimaxion house” was highly mechanized, considering installations, in terms of use and treatment of materials, was stimulated by aeroplane- and car production.

39-40. After World War II he was involved in constructions to be erected **quick** transportable. They should be of **great span and lightweight**. He was an autodidact, his constructions came about mostly from experiments. The results were geodesy domes and „Tensegrity” structures, based on octaeders and tetraeders. The EXPO pavilion in Montreal was a transparent dome with a diameter of 80 meters. Construction: a space frame of steel pipes enclosing 1,900 moulded acrylic panels.

43-46. Henn was one of the founders of the „Braunschweiger School“, an important architect’s school of the fifties and sixties. Pure functionality defines aesthetics.
Henn was one of the founder of the „Braunschweig School“, an important architect’s school of the fifties and sixties. **Pure functionality** defines aesthetics. Walter Henn - regarded as a leading exponent of the Braunschweig School - had a substantial impact on industrial and administrative building from the 1950s up until the 1970s.

47-50. Walter Henn completed the administration building, the research and development centre and the power facilities block for the light bulb manufacturer Osram in 1965.
In the 1950s, Quickborner – a team of management consultants in Germany – developed a new office layout concept called “**Bürolandschaft**” (Office-Landscape). As a critique to the cold and rigid array of desks, this new plan looked free and organic. Desks were scattered in a seemingly random fashion, and clustered in **work units** of different sizes. Large plants softened the environment, and created some degree of differentiation and privacy. In fact, this overall arrangement was anything but random. It was **based upon** an intensive **study of patterns of communication** – between different parts of the organization and different individuals. The Quickborner team put company staff of all ranks together on one open floor, creating a **non-hierarchical environment** that encouraged communication, discussion, and debate, and at the same time allowing for future flexibility.
Walter Henn completed the administration building, the research and development centre and the power facilities block for the light bulb manufacturer Osram in 1965. The ensemble stands on Candidstraße near the Isar water meadows and is the global corporate headquarters.
As is evident in particular from its appearance, the six-storey administration building is based on a square plan layout, which is inspired in terms of functionality and aesthetic by international modern architecture.
The main entrance on the south side is recognisable to the outside world by a long cantilevering steel canopy. The external appearance of the fully air-conditioned steel skeletal-framed building is defined by the suspended light-metal facade with the balustrade panels and the fixed double glazing running in bands along the building and accentuated by vertical, silver-grey anodised glazing bars. White light-metal external lamellae provide protection against solar radiation. As befitting the corporate activities of Osram, the building looks like a transparent silvery glistening cube, which emits light from within during the evening hours.

52-53. corporate architecture
Unlike the typical American high rise, the Olivetti building is formed from a central rectilinear two story building, roughly 115 meters by 40 meters, with two 25 x 30 x 60 meter tall towers located on opposite corners of the central building. The two towers are designed as inverted, top heavy cantilevers. Although the design of this building is unique and different, the structural elements are quite common. It seems to be an **incorporation of a steel lattice surrounding a concrete core** which runs into the earth to form the foundation of the structure. The sub-floors of the building are most likely poured concrete which help in the stability of the structure. In addition to the main structure, Eiermann has designed a **light steel superstructure** which acts as a shelf over the building and is utilized **to support the balconies and sun shades**.

54-55. The German architect Otto Frei had developed and built light surface structures, also constructions for tension forces. The EXPO Pavilion is a **suspended (tent) structure of steel masts and a cable net**. The roof cladding of plastic is hanged under the net.

56-58. 1968-72 Frei was comissioned adviser of the roofing the main sport facilities of the Olimpic Park in Munich. Working together with arch. Behnisch and Partner they designed an ensemble of tent roofs for the Olimpic Stadion and Park.

59. Prefabrication of reinforced concrete becomes general.

60- Immediately after completing his architectural degree at the Politecnico di Milano in 1948 Mangiarotti began collaborating with the Triennale in Milan for the VIII and IX Triennale but perhaps more importantly he left Italy for the United States in 1953 for two years where he came in contact with many of the major players in the international scene such as Walter Gropius, Mies van der Rohe and Konrad Wachsmann. He was also involved in the LOOP competition in Chicago and was a visiting professor to the Institute of Design at the Illinois Institute of Technology. It was during this brief but intense exposure to the new architectural styles being developed in the the United States that Mangiarotti developed his particular interest in concrete construction and the application of prefabrication and modular components to architecture and design.

61-63. Precast pre-stressed concrete systems for industrial use

64-67. Returning to Milan and starting his own design studio in partnership with Bruno Morassutti in 1955, they designed the Chiesa di Nostra Signora della Misercordia as one of their first major projects.

Expert use of the type of materials that fuelled the modernism revolution – concrete, steel and glass – combined with masterful technique and created a timeless building that continues to impress 60 years after its original creation.
The originality of the structure, its innovative roof structure and iconic transparent glass shell all work to create a highly evocative space.

69. Industrial production usually needs significant/big spaces, halls > the task is roofing big spaces

71. The most common is the hierarchical bar structure, because of the linear nature of most structural components and the rectilinear character of most enclosed spaces, so a practical assembly of linear members.

93. Construction: twelve 100 m-high support towers: steel masts of space truss, suspended steel trusses. The canopy is made of PTFE-coated (Poli(tetrafluoretilén)=teflon) glass fibre fabric, a durable and weather-resistant plastic, and is 52 m high in the middle - one metre for each week of the year. Its symmetry is interrupted by a hole through which a ventilation shaft from the Blackwall Tunnel rises.
Externally, it appears as a large white marquee with twelve 100 m-high yellow support towers, one for each month of the year, or each hour of the clock face, representing the role played by Greenwich Mean Time. In plan view it is circular, 365 m in diameter — one metre for each day of the year — with scalloped edges.