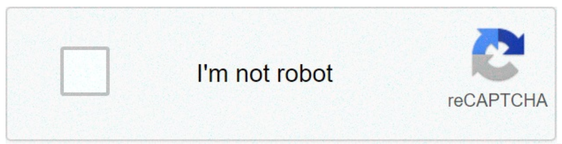

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Building materials and construction technology

Construction is one of the branches of civil engineering that is concerned directly with common people, as everyone wants to have beautiful dwellings. Buildings are built from long ago in history but the difference is of technology as early buildings were simple and just for the purpose of shelter. With the passage of time, revolutionary changes have appeared in construction also and it is all due to the technology that can be defined as practical use of your knowledge. In the beginning, buildings were made from stones and mud, but in recent time, we construct buildings using multiple types of materials including stone, timber, concrete, metals, glass, etc. Types of Construction TechnologiesConstruction industry includes a wide range of constructions suitable for all classes of society. Commercial construction, domestic construction, industrial construction, heavy or civil constructions are a few examples that are now displaying master pieces of construction technologies. Each of these requires different technological treatments. For domestic construction, simple technological methods are usually preferred and frequently available materials are mostly used. These are mostly low cost projects and are also short-term. In commercial construction, the basic concern is infrastructure that is responsible for strength and life of project. These are mostly launched by government agencies. These projects require latest construction technologies, equipment, and materials. Role of technology in building designsWith the passage of time, construction industry has passed through advancements. One of them is emphasis on designing buildings before practically constructing these buildings. Progress in technology has introduced successful techniques to develop strong and long lasting buildings. Development in the field of IT has become the main source for latest designing approach in construction technologies. Building Information Modeling (BIM) is one of such computerized systems that facilitate for collecting information about buildings under construction on regular basis. This system greatly enhances the communication among engineers and designers that are working on the project. Computer aided designing helps in designing flawless buildings as through computer simulations problems can be found and resolved before constructing buildings physically. Innovations in Construction TechnologyTechnological progress has introduced many innovations in field of construction industry. There is huge difference between new and old construction methods. Use of latest machinery has made its way through the civil engineering. Most of the building parts such as pillars, roofs, and concrete blocks are available in prepared forms that increase the speed of construction process greatly. Use of pre-stressed concrete tendons and beams strengthen the buildings along with speedy construction. Green ConstructionThe green revolution has also some effects on this industry. Global movement of saving the natural environment has emerged the latest concept. It means while constructing buildings, natural environment should not be spoiled and materials used for building must be eco-friendly. This concept should be implemented to all types of construction including domestic as well as commercial construction. Green construction is actually an eco-friendly construction system that follows the regulations, which are created to save the environment of our planet. LEEDThe latest approach in construction technology is LEED (Leadership in Energy and Environment Design). It is also introduced to monitor the green construction level in the industry. It assures the quality and checks the eco-friendly mode of construction. It also works to search and introduce the materials for green construction. Moreover, it also pays attention to all related aspects and monitors it keenly to make all the process eco-friendly by keeping a balance in energy level of system.Hercules Single Strand Tensioning SystemThe construction industry is re-energized by technology, particularly for building infrastructure locations such as bridges, as it requires extra strength and durability. For attaining this purpose, new technologies are wonderful, as they are reducing time and used men power with increased strength and robustness. In early system, cables were drawn manually and then concrete was poured to enhance the sturdiness by using massive labor. In spite of all this quality maintenance was big issue. It also increases the cost of project that sometimes goes beyond the expectations. Hercules Single Strand Stressing System provides a suitable solution for many such problems in huge projects for the strength of infrastructure. Use of modern technology and machinery guarantees the quality assurance of the project. Pre-stress concrete tendons with steel cables ensure the quality. Along with Hercules Single Strand Stressing Systems, other improvements can also be seen such as utilization of low-pressure hydraulics with jacks and chucks that dispense the tension cables swifter and devoid of the shock gaps that can form through the manual pulling.Styrofoam PanelsThis technology is being practiced for mainstream for the last decade. This technology provides good resistance to thermal convection that helps in creation of heat controlled homes. Styrofoam panels are actually EPS foam that is sealed between steel sheets for strength and this foam works as thermal resistor. It not only has heat resistance but also has capacity to endure the wind speed up to 140 mph. This makes it favorable in the areas targeted by hurricane. As it laminates the foam in steel sheets that make it safer from termites, as they can’t invade steel sheets. The durability and strength of Styrofoam make buildings long lasting and cleaner than buildings constructed with other materials. Use of new technology in construction endows with comfortable buildings for housing and business.Unbounded PT SlabsUnbonded PT slabs are being used in construction industry since long and have proven them beneficial. These are affordable for constructing modern buildings and are also considered reliable for their quality and strength. Their steel strands are greased well to resist rusting that increase their age. The unbonded PT slabs are light weight and flexible due to small thickness of its unbonded tendon. Due to this reason, unbonded PT slab patterns are able to make best use of complete strength of a concrete slab. These are successfully used at different places such as on roofs, pavements, and even in the round water tanks. One thing must be kept in mind while purchasing them that never compromise on their quality. Skip to Main Content May 29, 2020Concrete Choreography. Image © Axel CrettenandA couple of years ago, digital fabrication was making headlines regularly, promising to drastically change the architecture practice. The revolution in architecture might not have arrived yet, but research projects, experiments and the dedication of several architects and universities already opened a new realm of possibilities for architectural expression. Therefore, it seems appropriate to give an overview of the impact the technology had so far within the architecture practice. This article covers the different types of processes within the field and the projects that experiment with them, with the scope of reframing the architectural potential of digital fabrication.+ 11 Cutieru June 03, 2019CTF Museum under construction within the existing KPF development. Image Courtesy of SO-ILAs a firm which has already won major awards, worked on culturally significant projects on a large scale, and generally achieved substantial success and recognition in just over 10 years, SO-IL seem to straddle a line between being an “emerging” and an “established” practice. Florian Idenburg and Jing Liu founded SO-IL (Solid Objectives-Idenburg Liu) in 2008 and have since gained a reputation for modern, clean-lined designs, but often with a unique material twist.+ 5 Schires June 21, 2018Courtesy of Space PopularSolutions from the past can often provide practical answers for the problems of the future; as the London-based design and research firm, Space Popular demonstrate with their "Timber Hearth" concept. It is a building system that uses prefabrication to help DIY home-builders construct their own dwellings without needing to rely on professional or specialized labor. Presented as part of the ongoing 2018 Venice Biennale exhibition “Plots Prints Projections,” the concept takes inspiration from the ancient "hearth" tradition to explain how a system designed around a factory-built core can create new opportunities for the future of home construction.+ 33 McManus June 04, 2018Courtesy of www.alansfactoryoutlet.comEver wondered about the hardest and softest woods in the world? As architects, we're all pretty familiar with the softest: Balsa. Its material qualities are what make it so attractive to make models. But what about the the strongest wood in the world? Ever pondered just how many pounds or kilos of force they can withstand? Editorial Team October 16, 2017 Have you ever spent hours calibrating the nozzle of a 3D printer or preparing a print-ready file – only to find that the model has failed because of a missed zero-thickness wall? With this in mind, the Platonics Ark—a 3D printer currently being developed in Helsinki, Finland—has one simple goal: to remove all unnecessary set-up and technical processes by means of intelligent automation and, as a result, almost entirely eliminate the wasted time that architects and designers spend calibrating printers, or working up print-ready files.+ 9 Editorial Team December 01, 2015Day 98. Image via Quartz / Supplied by Nut BrotherFrom the Bird’s Nest to the CCTV headquarters, for the past 100 days Chinese performance artist "Nut Brother" has been wandering the streets of Beijing collecting smog with an industrial vacuum so that he can eventually turn it into bricks. He has now began to form his bricks by mixing a combination of the collected "dust and smog" with clay. As he told Quartz, the project is meant to be a symbol. Read the whole story here. Rosenfield August 28, 2015via WiredLEGO enthusiast Arnon Rosan has created a full-scale, interlocking "LEGO" block that allows users to quickly assemble life-size structures. The LEGO-like "EverBlock" is a modular system of polypropylene blocks with raised lugs that can be stacked to form furniture, installations or even emergency shelters. As Wired reports, the blocks come in 14 colors, three sizes - full (one-foot-long), half (six-inches), and quarter (three-inches) - and vary in weight from a quarter to two pounds."Each module is designed to connect easily with the parts above and below, using a pressure fit which creates a strong link between blocks. Because of its unique lug system, you can stagger EverBlocks in 3" increments, to create all types of patterns," says EverBlock. Rosenfield August 20, 2015Glass can be molded, formed, blown, plated, sintered and now 3D printed. Neri Oxman and her Mediated Matter Group team has just unveiled their new glass printing platform: G3DP: Additive Manufacturing of Optically Transparent Glass. A collaboration with the Glass Lab at MIT, G3DP is the first of its kind and can 3D print optically transparent glass with stunning precision. "G3DP is an additive manufacturing platform designed to print optically transparent glass," Oxman told ArchDaily. "The tunability enabled by geometrical and optical variation driven by form, transparency and color variation can drive; limit or control light transmission, reflection and refraction, and therefore carries significant implications for all things glass: aerodynamic building facades optimized for solar gain, geometrically customized and variable thickness lighting devices and so on." Rosenfield August 17, 2015© ViewView has raised $150 million to fund their specialized Dynamic Glass tints. The new technology automatically responds to outdoor conditions or from a mobile phone, resulting in a reactive tint that reduces heat and glare. This, as the company said in a press release, allows for "greater occupant comfort and energy savings without ever compromising the view." The tinted windows have been installed in more than 100 locations across North America. The funds will be used to accelerate product development. Rosenfield May 06, 2015 The world's energy infrastructure may soon undergo significant change; Tesla Motors recently unveiled the Powerwall, a compact, lithium-ion battery pack that will allow residents to autonomously consume energy by drawing from their own sun-powered reserve. For just $3,500, you can purchase an attractive, wall-mounted battery capable of storing up to 10 kilowatt-hours of energy - about a third of what the average US household uses daily. Beyond this, the company will also be offering scalable Powerpacks to businesses and utility companies that will allow limitless storage. Powerwalls will go out for delivery this summer. Rosenfield May 05, 2015© Google / BIG / Heatherwick StudioGoogle's proposed California headquarters will be built with robots, according to the most recent planning documents received by the City of Mountain View Council. As the Architects' Journal reported first, the documents detail BIG and Heatherwick Studio's plan to construct the canopy-like structure's interiors with a team of robotic-crane hybrids known as "crabots."These crabots would, in theory, establish a "'hackable' system for the building of the interior structures," says the documents, that would allow for limitless, easy, and affordable reconfiguration of space throughout the building's life. Rosenfield April 07, 2015© Oskar Da Riz Fotografie via MUDECThe poor quality and laying of stone flooring in Milan's newly completed Museum of Culture has led its architect, David Chipperfield to dissociate himself with the building. Blasting officials for skimping on materials, the British architect is demanding his name be removed from the project, claiming the building is now a "museum of horrors" and a "pathetic end to 15 years of work" due to the low quality flooring. On the contrary, Milan's council says the material decision was made in the "interests of the taxpayers," further claiming that, according to councillor Filippo del Corno, Chipperfield has been "unreasonable and impossible to please." Rosenfield March 25, 2015© Matthew Millman PhotographyFollowing on from other experiments in 3-D Printing including a proposal for a house printed from salt and an earthquake resistant column inspired by Incan masonry, the California-based Emerging Objects team has created Bloom, a pavilion constructed from 840 unique blocks 3-D printed from portland cement.The 9-foot (2.7 meter) tall pavilion is cruciform in plan, morphing as it rises to become the same cruciform shape twisted by 45 degrees. On the facade of the pavilion, perforations are mapped onto the cement blocks to create a design inspired by traditional Thai flower patterns.+ 16 Stott March 13, 2015Courtesy of ZAarchitectsWhen one hears the term masonry architecture, digital fabrication and automated construction processes are probably not the first ideas to come to mind. By its very nature, the architecture produced with stone masonry is often heavy, massive, and incorporates less natural light than alternative methods. However, with their research proposal for "Smart Masonry," ZAarchitects are proposing to change masonry buildings as we know them and open opportunities for digital fabrication techniques in stone and other previously antiquated materials. Read on after the break to get a glimpse of what these new masonry buildings could look like and learn more about the process behind their construction.+ 11 Rawn March 06, 2015 In the United States alone, more than 125 million plastic bottles are discarded each day, 80 percent of which end up in a landfill. This waste could potentially be diverted and used to construct nearly 10,000, 1200-square-foot homes (taking in consideration it takes an average of 14,000 plastic bottles to build a home that size). Many believe this process could be a viable option for affordable housing and even help solve homelessness. Rosenfield March 06, 2015© Dubai Government“See the future, create the future,” this is the motto of Dubai’s newly unveiled “Museum of the Future.” The metallic oblong-structure, planned for a corner lot in Dubai’s central financial district next to the Emirates Towers on Sheikh Zayed Road, is said to become “an incubator for ideas and real designs, a driver for innovation and a global destination for inventors and entrepreneurs.” "The world is entering a new era of accelerated knowledge and great technological revolutions,” tweeted United Arab Emirates prime minister Sheikh Mohammed Bin Rashid Al Maktoum. "We aim to lead in that era, not to follow and lag behind. The Museum of the Future is the first step of many to come, marking the beginning of great achievements."Holograms, robotics and 3-D printing will play a crucial role in the structure’s realization. Learn more and watch a video fly-through the building after the break.+ 7 Rosenfield March 03, 2015With a recently released animation entitled “We Start the Future of Construction,” Coop Himmelb(l)au announced their intention to take digital fabrication to a radical new scale, demonstrating how technology is impacting almost every aspect of the architectural profession. The advent of building information modeling and other modeling software has transformed how architects and engineers navigate the construction process, allowing us to achieve increasingly complex forms that can be modeled with the aid of CNC machining and 3D Printing, but still there remains a wide gap between the technologies available to architects and those employed by builders. When it comes to a building’s actual construction we have been limited by the great costs associated with non-standard components and labor - but now, the automated practices that transformed manufacturing industries could revolutionize how we make buildings.Last week, ArchDaily sat down with co-founder, Design Principal and CEO of Coop Himmelb(l)au, Wolf D. Prix for his thoughts on the future of construction and the role of the architect in an increasingly technological practice. Read on after the break to find out how robots could impact architectural design, construction, and the future of the profession.+ 8 Rawn December 22, 2014© STAMER KONTORConcrete construction has been an important part of architectural practice since the Roman Empire. Extremely malleable, fluid concrete is capable of being poured into almost any conceivable form. In theory, this makes it an ideal building material. In practice, however, creating complex forms out of concrete is extremely inefficient. Pouring on sight requires formwork that is painstakingly made by hand, and precast concrete is usually limited by orthogonal molds. Concrete has become restricted to a few simple forms that are easy and cheap to produce when, in many cases, a building would benefit from concrete casting that is optimized for its structural and economical needs. How do we make such optimization feasible? This is the question that the EU sponsored TailorCrete has attempted to answer. A research consortium lasting for four years, TailorCrete is exploring new technologies that could make non-standard concrete structures commonplace. Walker

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