

Construction Industry Board (CITB) suggests that over 230,000 new construction jobs could be created in the UK by 2020. The demand for workers is high and skills shortages are still visible. There are not enough skilled workers in British construction sector at the moment, taking into account also migrant traders, for instance, Polish builders. Will robots fill this gap? Are they future construction workers?

Robots revolution

The Future of Modern Construction

Robotics has developed enough to be implemented in the construction industry and share duties with human workers. Many repetitive tasks can be done by robots. We are already used to robotics in motor industry, often seeing them in car factories. Machines on building sites need to be movable and adaptable to various building environment. Robots excel in places where humans can't, for instance, they can operate in dangerous environments with health and safety concerns.

First robots used in construction environment are those working on demolition projects. Brokk and Husqvarna produce commercial remote-controlled robots for demolition, which can break down walls, crush concrete and cut through rebar. Currently, works are on new types of demolition robots that are very energy efficient and able to scan, plan and execute the demolition without human intervention.

In the UK, the University of Leeds is pioneering to create robots and drones that can repair street lights or autonomously inspect, diagnose, repair and prevent potholes in roads and also live in utility pipes to check and repair or for metering and reporting tasks.

Human labour is efficient and reliable with a high standard of detail. Robots are perfect at delivering large volumes of very repetitive elements. Robots with articulated arms are able to lay bricks, set tile or finish concrete floors. Fast Bricks Robotics from Australia plans to commercialise the globally patented technology of the Hadrian Robotic brick and block laying machine and system. Hadrian Robot can create the brick framework of property in just two days, working approximately 20 times faster than a human bricklayer. The robot bricklayer uses information from a 3D CAD plan of building for brick placement. The mortar or adhesive is applied under pressure to the head of the telescopic boom. Construction Robotics from New York released semi-automated mason- SAM. This robotic bricklayer costs approximately half a million dollars so returns on such robotics investments will be mainly on major construction projects.

Moreover, the Future Cities Laboratory (FCL) of the Singapore-ETH Centre, in collaboration with ROB Technologies AG, is developing a robotic tiling machine. The robots prototype has

been already tested in a public housing project. In 'Building Enthusiasm for Construction Robotics' by Vicki Speed we are reading that ROB Technologies has also developed FlexBrick, a robotic assembly process for non-standard brickwork. 'It has been used to build the façade for a winery in Fläsch, Switzerland, the façade for three residential blocks in Locarno, Switzerland, a wall for the new training stadium of Manchester City in England and acoustically active wall panels for a concert hall in Frankfurt, Germany.

Other innovations are robotic exoskeletons which could be used in jobs that require a lot of repetitive works which are not suitable for fixed automation machines. Assistant-type exoskeletal robots provide extra power to human

parts and use of robots to assemble them might be economic, very fast and reducing waste. The Concrete-Jet robot developed at the University of Southern California could potentially complete the structure of 185 square meters house in 24 hours. However, 3D printing of our houses is still a distance possibility.

Demolition robots, brick laying robots and wearable bionic suits have a place in the construction world. As robots are getting cheaper one day they might fill the void that exists due to shrinking numbers of available bricklayers. Experts say that using of robots improves site safety, reduces the level of waste and cut down the time of realisation and cost. Construction robotics is based on the same principles

Demolition robots, brick laying robots and wearable bionic suits have a place in the construction world.

workers by reducing the muscle tension. Vicki Speed wrote that 'Lockheed Martin is developing a next-generation, unpowered, lightweight exoskeleton called FORTIS to enhance user strength and endurance. Exoskeletons use human vision and judgment while performing works a lot faster.

In Amy Frearson interview for Dezeen, the Austrian architect Coop Himmelb(l)au founder Wolf D Prix is discussing the use of robots at one of his latest projects – the Museum of Contemporary Art and Planning Exhibition (MOCAPE) in Shenzhen. A team of robots led by a building information modelling (BIM) will assemble the museum's irregularly curved stainless-steel centre. They will mould, assemble, weld and polish the hyperbolic metal plates' Wolf D Prix told Dezeen. Estimated six months work of approximately 160 labourers could be shortened to 8 robots working on a site for 12 weeks. Combining robots with the use of 3D-printed building components will ease to construct complex structures. Innovations to 3D print prefabricated

like in manufacturing. Robots deliver on speed, machine-consistent quality and accuracy. Research and development of intelligent robotic solutions continue. Organisation FIATECH (Fully Integrated and Automated Technologies for Construction), was formed in 2000 to promote and deliver the innovative practices and technologies on capital projects.

Prefabrication and BIM are the recent developments in building industry. Buildings constructed by machines on the production line are common nowadays. Robotics on a building site is still less implemented, but the idea that we will see robots working on site alongside people in the future are inevitably close. Construction companies working on large and complex projects will soon acquire semi-autonomous and autonomous robotic systems to increase safety, efficiency and quality. The growth in construction robotics is expected over the next years.

Source:
dezeen.com, insideunmannedsystems.com