



CyBe Construction

CyBe 3Dcp SPECIFICATIONS

3D concrete printers :

Redefining Construction by
enabling 3D concrete printing

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THANK YOU

On behalf of CyBe Construction we want to thank you for your interest in our 3D Concrete printing solutions. We've tried to include all options and details of our products and services in this document. If you have any questions that are not being answered in this document, please feel free to contact us by phone or email. We're more than happy to tell you how our products and services can help you deliver projects faster, sustainable and more efficiently.

Berry Hendriks
CEO, Founder



GLOBAL PARTNERSHIPS TO ACHIEVE OUR COMMON GOALS

The global housing shortage is a problem that needs to be solved. By working together with our partners we can produce and realize sustainable houses faster than ever before. By cooperating with companies all over the world we can make a difference in the global construction industry.

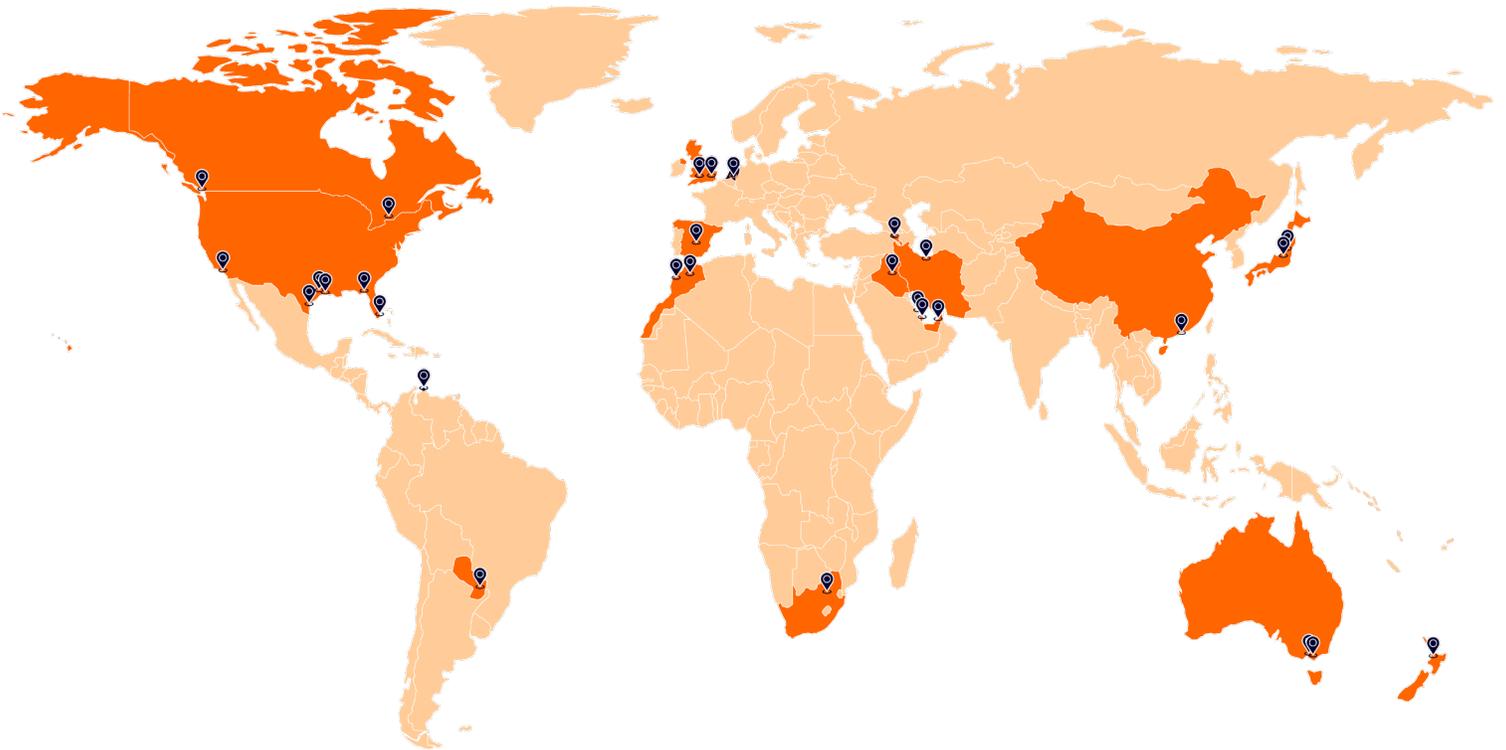


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ABOUT CYBE

Old ways won't open new doors! With this in mind CEO and founder Berry Hendriks wanted to redefine the global construction industry. Seeing the global issues of house shortages and the environmental impact of conventional building methods he decided it was time for a change! Putting his fascination with building and innovation to the test, Berry started planning and in November 2013, the award-winning CyBe Construction was born. Since then, CyBe has developed hardware, software, building materials, and learning platforms that are being used all over the world. Becoming a global leader in the 3D Concrete printing industry, CyBe's printing technology drastically reduces time, costs, resources and Co2 emission regarding construction.

MISSION

We strive to solve current and future economical, social and ecological problems in the construction industry. With the continuous development of our technology and knowledge we want to redefine the construction industry by producing housing projects faster, sustainable and more affordable than ever before.

VISION

To provide our technology, knowledge and consultancy, so others can create affordable and sustainable buildings and objects.



3D CONCRETE PRINTERS:



FIXED

Prefab | R&D purpose



CYBE R 3DP

Our CyBe R 3DP is a standard ABB robotic arm placed on a metal frame that needs to be fixed on the floor. It is the ideal 3D concrete printer for institutes, universities and precast concrete suppliers to perform inhouse testing, prototyping and precast production.

CYBE RC 3DP

The CyBe RC 3DP is our mobile printer that is ideal for printing on multiple locations. The ABB Robotic arm is placed on a movable crawler system. The tracks provide the crawler maneuverability which makes it easy to move the robot across the jobsite.

MOBILE

On site applications



TRACK

Prefab | R&D purpose



CYBE RT 3DP

The CyBe RT 3DP is our printer placed on a track system. When printing large objects at a facility then this type of printer is a great option. The ABB robotic arm is placed on a movable track. This makes it a perfect 3D concrete printing device for any type of factory or knowledge institute.



3D CONCRETE PRINTERS:

GANTRY NEW

Prefab | On site applications



CYBE G 3DP

The CyBe G 3DP printer is a Gantry printer that can print with speeds up to 500 mm per second. It can create large objects in a factory or on-site. Our advised dimensions for our Gantry system are 7 x 10 x 4 mtr (22.93 x 32.80 x 13.12).

With these dimensions you can not only create large objects but you can also build according to our PPVC (Prefabricated, Prefinished, Volumetric Construction) method.

CYBE GR 3DP

The CyBe GR 3DP is the most advanced concrete printer on the market! It combines our Gantry with the unique capabilities of our Robotic systems. With our GR system you can easily create organic and dynamic shapes and print large objects at the same time.

GANTRY with ROBOT NEW

Prefab | On site applications



THE MIXING PUMP SYSTEM:



Our mixing pump system is engineered to make sure that you will get the best possible mortar during printing. With our custom made rotor stator and additive pump we can easily adjust the printing material. An automatic startup kit, heating- and cooling unit are available as additional options.



SPECIFICATIONS

OUR 3D PRINT PHILOSOPHY

By having a flexible team who can guide partners through the 3D concrete printing process, we can realize projects faster than ever before. Combining our knowledge with our fast printing machinery we can make a change in the construction industry.



HIGH QUALITY PRINTING EQUIPMENT



We inhouse develop and engineer our 3D concrete printing equipment. By working with the best suppliers in the market and by using top quality materials, we produce long lasting and heavy duty resistance equipment.

CONTROLLING THE PROCESS

By continually developing every aspect within the 3D printing process we can help partners to grow and create their projects. We have developed a comprehensive system that allows our partners to accelerate their business. We do not only deliver the machinery, but also provide services and materials needed to succeed.

CYBE SOFTWARE

With our in-house developed software Chysel we can prepare the planned print. We can determine the toolpath and get more insight in the time and material needed for the print itself. With our Artysan software we can monitor the 3D print and also collect 3D printing statistics. It is also the tool that helps us to provide customers with the best service and support.

CYBE MORTAR:

Specially designed and created to achieve the best possible output for 3D concrete printing. Our CyBe mortar is the best product available and has unique capabilities. We can realize projects with a printing speed of 500 mm per second due to the unique characteristics of our mortar. Our material has a strength of 20 N/mm² at day 1 and 40 N/mm² after 29 days. The hardening time of our mortar is 3 minutes. Due to this characteristic we can print elements in one-go!

MODULAR SYSTEM

With the developed options for our 3D concrete printing machinery, we can easily adjust our equipment to your printing requirements.



SPECIFICATIONS | PART 1

	FIXED	MOBILE	TRACK	GANTRY	GANTRY with ROBOT
DIMENSIONS:					
Equipment dimensions (L X W X H) ⁽¹⁾	2.5 x 3.0 x 4.0 m	2.5 x 3.0 x 4.0 m	2.5 x 4.0* x 4.0 m <small>* W can up by 1.0 m</small>	5.0 x 5.0 x 2.5 m	6.0 x 6.0 x 3.25 m
Reach ⁽²⁾	2.65- 3.20 m	2.65- 3.20 m	2.65- 3.20 m	4.0 x 4.0 x 2.0 m	5.0 x 5.0 x 3.5 m
Number of axis	6	6 * 7 with height control	7	4	9
Printer weight	2,000 kg	3,500 kg	4,000 kg ⁽⁶⁾	T.B.D. ⁽⁶⁾	T.B.D. ⁽⁶⁾
PERFORMANCE:					
Position repeatability	0.15 mm	0.15 mm	0.15 mm	0.15 mm	0.15 mm
Path repeatability:	1.5 mm	1.5 mm	1.5 mm	1.0 mm	1.5 mm
Print material ⁽³⁾	CyBe MORTAR	CyBe MORTAR	CyBe MORTAR	CyBe MORTAR	CyBe MORTAR
Layer resolution ⁽⁴⁾	10 - 50 mm	10 - 50 mm	10 - 50 mm	10 - 50 mm	10 - 50 mm
Print speed ⁽⁵⁾	50 - 500 mm/s	50 - 500 mm/s	50 - 500 mm/s	50 - 250 mm/s	50 - 500 mm/s
Driving speed		3 km/h			
Print precision	1/1/1 mm	1/1/1 mm	1/1/1 mm	1/1/1 mm	1/1/1 mm
Nozzle Diameter ⁽⁴⁾ - standard \varnothing	1"	1"	1"	1"	1"
SAFETY:					
Double circuits with supervision	yes	yes	yes	yes	yes
Emergency stops	4	5	5+	5+	5+
Safety functions	yes	yes	yes	yes	yes
Safety fence	optional	no	optional	optional	optional
Environment temperature	<i>Between 5 - 50 °C (21 - 122°F)</i>	<i>Between 5 - 50 °C (21 - 122°F)</i>	<i>Between 5 - 50 °C (21 - 122°F)</i>	<i>Between 5 - 50 °C (21 - 122°F)</i>	<i>Between 5 - 50 °C (21 - 122°F)</i>
Humidity	<i>Relative max. 95%</i>	<i>Relative max. 95%</i>	<i>Relative max. 95%</i>	<i>Relative max. 95%</i>	<i>Relative max. 95%</i>
CONNECTIVITY:					
WiFi is required for service	yes	yes	yes	yes	yes
Stand-alone USB-printing	yes	yes	yes	yes	yes
Remote support	yes	yes	yes	yes	yes
WARRANTY & SERVICE:					
CE marking	yes	yes	yes	yes	yes
Warranty	12 months	12 months	12 months	12 months	12 months

- (1) Extended Height 350cm - build volume is spherical - the max. L, W or H of an element has a direct relation on the other max. dimensions in L, W and/or H.
- (2) Depends on chosen manipulator
- (3) Other material possible after review
- (4) Depends on chosen nozzle
- (5) Standard 500 mm/s
- (6) Depends on final selected dimensions of the 3Dprinter



SPECIFICATIONS | PART 2

	FIXED	MOBILE	TRACK	GANTRY	GANTRY with ROBOT
WHAT'S INCLUDED:					
Material storage	yes	yes	yes	yes	yes
Robot base	yes	no	no	no	no
Crawler system	no	yes	no	no	no
Track system	no	no	yes	no	no
Training 4 print operators ⁽¹⁾	yes	yes	yes	yes	yes

DELIVERY:					
Production time ⁽³⁾	5-7 months	5-7 months	5-7 months	6-8 months	6-8 months

SYSTEM - CONTROLLER :	
Physical controller (LxWxH)	0.95 x 0.75 x 1.4 m
Weight ⁽²⁾	300 kg
Noise	Max. 70 dB
Electrical connection	
Supply voltage	200 - 600 V, 50/60 Hz
Power socket	CEE 5 pole, 32 A
Rated power ^{supply transformer}	7.2 - 7.8 kVA
Power consumption	2.5/ 3.5 kW

SYSTEM - MIX PUMP SYSTEM:	
Dimensions (L x W x H)	1.5 x 1.0 x 1.8 m
Weight ⁽²⁾	1,300 kg
Noise	max. 80 dB
Electrical connection	
Supply voltage	400 V, 50 Hz
Power socket	CEE 5 pole, 32 A
Rated power	11.3 kVA
Power consumption	8 kW
Water connection	
Connection - pump	Geka water connection with water pump
Connection	Geka water connection
Water gauge	75 - 750 L/h
Concrete hose	15 mtr ¹ hose

SOFTWARE:	
CyBe Chysel	Rhinoceros 6 or 7 ^{plugin}
CyBe Artysan	On the controller/ laptop
File types	.3dm
OS	Windows

(1) The basic training for 4 print-operators & safety instructors will be executed in the Netherlands. On-site training, additional operators and advanced training programs are optional.

(2) Depends on chosen manipulator

(3) @ CyBe facility in the Netherlands

PRINTING STRATEGY

	FIXED	MOBILE	TRACK	GANTRY	GANTRY with ROBOT
WEATHER CONDITIONS: Optimal printing weather - range	It is possible to print at -5 °C or at 50°C (23°F- 122°F). Direct sunlight may affect the rapid hydration of the freshly printed concrete. In certain regions (e.g. MENA region) we recommend to cover the concrete print and curing process. Depending on whether the humidity is high or low, the curing process must be adjusted accordingly. To protect the print from raining impact we also advise to use a tent or protection cover. High wind speeds should be avoided when printing. These elements can affect the hydration and curing of the 3D printed structure.				
SET UP TIME:	n/a	1-2 hours	n/a	4 hours ⁽¹⁾	8 hours ⁽¹⁾
AMOUNT OF OPERATORS:	1-2 operators ⁽²⁾	1-2 operators ⁽²⁾	1-2 operators ⁽²⁾	1-2 operators ⁽²⁾	1-2 operators ⁽²⁾
STRUCTURAL PRINCIPLES:	Precast	On-site Precast Semi-precast	Precast	On-site Precast	On-site Precast
PRINTED FOUNDATION:	Yes, precasted	Yes	Yes, precasted	Yes	Yes
FLOORS/ STOREYS:	The amount of stories is unlimited when using each 3Dcp'er in the (semi)-precast printing strategy. On-site is limited till: CyBe RC: 1 floor (only ground floor); CyBe G and CyBe GR: up to 3 stories ⁽³⁾ .				
MAINTENANCE & WEARING PARTS⁽⁴⁾:	Rotor stator, concrete hoses, mixing iron - in starter kit multiple sets of each are included (self-replaceable). Annual maintenance check is included within the Service Level Agreement (page 9).				

- (1) Depends on dimensions of the gantry system.
- (2) Depends on selected options of the 3D printer.
- (3) Depends on the height of the gantry system.
- (4) Depends on proper usage of the 3D printer.

Printing strategy

On-site:

When printing on-site, the printer is transported to the construction site. The crawler is moved towards its starting position. After completing the first wall segments, the crawler then can be moved towards the next position to repeat the printing process.

Prefab:

Each element is printed at a local facility. Once the wall segments have completed the curing process they are ready to be transported to the construction site.

Semi-prefab:

The printer is placed on the determined location at the construction site. From this location, elements are being produced and moved towards the final position. This method is great and highly efficient for larger projects.



SERVICE LEVEL AGREEMENT

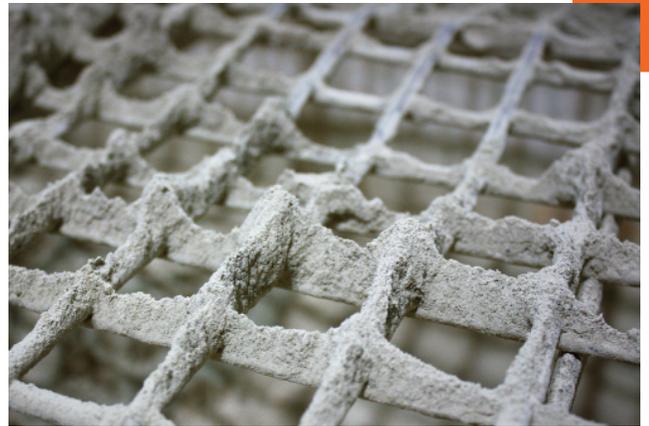
OPTIMAL PRINTING WEATHER - RANGE

Reliability, flexibility and efficiency are important factors of achieving business goals. While developing our equipment we highly value ease of use by using our innovative technology. Based on the experience from previous projects we are able to advise and solve almost every challenge. The support that we deliver shall be determined in our customized service level agreement. An annual maintenance & inspection, a fast availability of spare parts, virtual support, access to the CyBe Lybary and academy are also mentioned in our SLA.

MATERIAL

CYBE MORTAR

CyBe Mortar is our high-performance and specially developed 3D concrete printing product. Our product has proven itself that it can be used in all kinds of environments. The Mortar is non-metallic and obtains a very low percentage of chloride and sulfate. CyBe Mortar sets in 3 minutes and achieves its structural strength in 1 hour. It offers the opportunity to develop and produce low shrinkage objects. To get the best printing results we strongly recommend to use the CyBe Mortar with our 3D Concrete printing equipment.



We share our knowledge and our material technology with our customers. In order to do so we have a partnership with KORODUR for the development of our CyBe Mortar. Our Mortar can be bought as a ready mix or being produced locally. With the help of KORODUR we can add and test your local used materials with our compound mix.

Once the results are inline with our standards we can proceed by producing the CyBe Mortar locally at your facility.

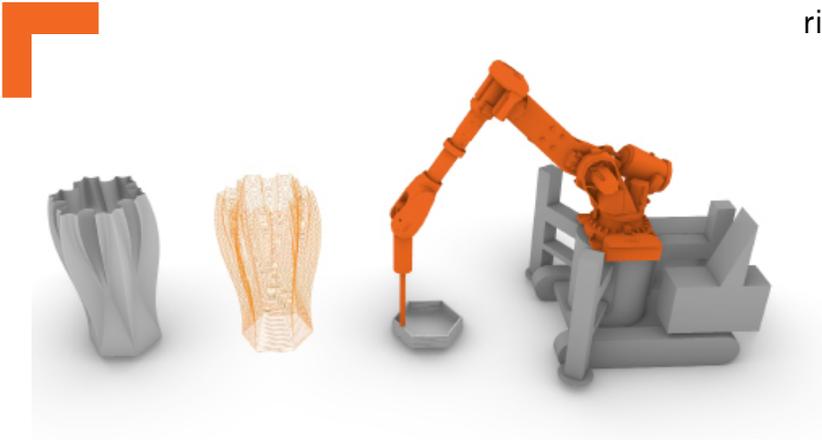
With the usage of CyBe Mortar, construction companies lower their carbon footprint up to 32% in comparison to Portland cement.



SOFTWARE

CYBE ARTYSAN:

Artysan is one of the two standard software applications delivered once a printer has been purchased. Artysan is specially designed to provide operators with the necessary data and feedback to create a successful 3D concrete print. With the usage of Artysan we improve the general design of the print itself. It creates an overall easier, quicker and more reliable workflow.



CYBE CHYSEL:

With Chysel you can slice the 3D model that has been created. By using our Chysel software you can not only pre-determine the toolpath of the ABB robot, but also personalize your printing strategy. You can adjust the layer width, height and printing speed. During the print itself Chysel will keep track of the already printed objects. It ensures that the 3D printer will not collide with finished printed objects. It fully understands the movement of the 6-axis ABB robot. This drastically reduces the risk of tool and workpiece damages.

CYBE PARTNER PROGRAM

Getting you to the NEXT Level

At CyBe, we strongly believe in working together - therefore it is our ambition to bring our partner to the next level. Under the partner program, to start with, we work together on making a solid business case - to conclude how to build faster and more affordable. Upon purchasing the 3Dprinter, you become our partner within your region. Besides, you get professional support from CyBe and access to our Lybrary. This includes an offer of different designs, knowledge and the CyBe Academy. The CyBe Partner Program focuses on the development of sharing knowledge and information to become successful.



We Build

In addition to providing technology to build faster, more affordably and more sustainably, CyBe Construction is above all a construction company - and uses the technology in numerous projects that can be found on the following pages.

Within such a construction project, CyBe may have the following roles and support its partners throughout the process:

Design & Engineering Services

Within our organisation we have a dedicated team of architects and structural engineers with whom we can help to completely support our partners with making Architectural and Structural design plans and supporting them to submit for construction permit. Also by our D&E team the LyVe label is being provided - accessible through the Lybrary. People all over the globe want to live their Lives! With the Lyve label we enable living and are focusing to provide livable spaces which people experience as comfortable, spacious, sustainable and durable.

If you would like to have your own architect or structural engineer, this is also possible. We are flexible and can provide assistance where necessary.

3Dprinting services

The elements or building parts can be printed by our team. This can either be done on-site or at our facility in the Netherlands. Depending on the project location and size of the building one of these possibilities might be most interesting. Together we will determine what would be most sufficient within your project.

When we are employed as a general contractor, we work in the region of our main office; the Netherlands. We hire specialists and partners to advise and contribute to plumbing, heating and air conditioning, painting and roofing aspects. This comes with our regular services like Design, Engineering and 3D Printing.



General Contracting (in the Netherlands)

CyBe serves as general contractor, which makes us responsible for day-to-day oversight over the entire construction process and job site. This consists of organizing the management of vendors and trades, but also the communication to and between all involved parties throughout the entire building project. We work as the central pivot during this process.



REFERENCE PROJECTS

R & DRONE LABORATORY

DUBAI - 2017



In order for DEWA, CyBe has produced the R&D Laboratory. This building is the 1st approved 3D printed building in the UAE within the municipality of Dubai. CyBe was responsible for the engineering and construction of the building. The project was delivered in the second quarter of 2017.

The laboratory will conduct the research on drones and 3D printing technologies. It's based at the Solar park as a part of the R&D center.

3D HOUSING 05

ITALY - 2018

In March 2018 we printed the 1st 3D printed building in Europe! During the Milan Design week, we 3D printed a villa at Piazza Beccaria in the center in Milan. It's a 100 m², 4 room villa that consists of 35 wall elements. It only took 46 hours to print the total building.



3D STUDIO 2030

SAUDI ARABI - 2018



3D printed homes are set to become mass production solutions in the middle east. Thanks to a world-first project in Saudi Arabia, with CCC testing the technology, this 80 m² single bedroom house consists of 48 elements. 27 walls and 21 parapets which we have printed on-site in only one week.

DE VERGADERFABRIEK

THE NETHERLANDS - 2018/2019

De Vergaderfabriek is a 100 m² building which was established by CyBe in collaboration with Revelating, The Form Foundation and Witteveen&Bos. In execution of Center4Moods, De Vergaderfabriek is the 1st location in Europe that allows guests. The shape and content of the building introduces users to a fully new experience of space and senses.



LA SPHÈRE

FRANCE - 2020



La Sphère is a guard house created by CyBe in cooperation with Le Havre Seine Métropole. It's located in the heart of the residence "Maréchal de Lattre de Tassigny". This 31 m² guard house also functions as a reception area for the caretaker of the residents. The building consists of 11 wall elements and is printed on site in only 21 hours.



REFERENCE PROJECTS

ROBUUST VILLA |

CURAÇAO - 2021



Our team printed together with the help of our partner Betonindustrie Brievengat in Curaçao the first 3D printed building on the island. During the on-site training the walls of the Office building were printed off-site and afterwards transported to the final location. The building consists of 13 printed walls, printed in only 7 days.

TRA BUILDING |

Johannesburg - 2022

During the onsite training in Johannesburg, we worked with their team to print South Africa's first 3D printed building. The building was designed by our partner and printed with the help of CyBe's Design & Engineering team. The total printing time of the 40 m² building, which consists of 13 walls, was achieved in just 10 hours, spread over 5 training days.



REFERENCE PROJECTS

ARTIFICIAL REEF |



The company Seaboost has requested CyBe to print multiple artificial reef modules. The modules were printed in CyBe's R&D facility in the Netherlands and afterwards transported to France. This promotes the stability and development of local marine life and can be efficient support for the reconstruction of biodiversity. We are proud that our technology and products can contribute to this project.

FRANCE - 2018-PRESENT

MANHOLES |

In 2018 we produced Manholes by using our 3D printing technology. These manholes were designed and engineered by our team and produced at our facility in the Netherlands.

THE NETHERLANDS - 2018



BRIDGES |



In cooperation with the Antea Group we produced a bridge that is built out of 3 segments. It only took 45 minutes to fabricate every piece. Also we could produce all the elements without relocating our crawler. The total printing time was 2 hours and 15 minutes. After the hardening process the elements were shipped towards their final destination.

THE NETHERLANDS - 2018

STREET FURNITURE |

At the request of Dura Vermeer CyBe has printed 5 concrete city benches for the city of Haarlem in the Netherlands. The benches were produced on-site. After seeing the end results the city of Haarlem asked CyBe to produce 5 more benches for the city center.

THE NETHERLANDS - 2018



CITY BENCHES |



In order for the municipality of Oss we have produced two types of city benches. One is acting as a sandbox for children and the other acts as a large flower pot and sitting area. A combination of fine wood and our own CyBe Mortar material was used for this project.

THE NETHERLANDS - 2019

SAPPORO PARK RESTROOM |

Our partner AIZAWA printed two self contained toilets for a local government in India. It's designed and produced to ensure the availability of water and sanitation for the local community.

JAPAN - 2020



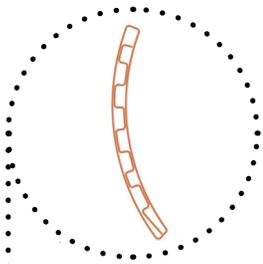
LYVE HOUSING

We enable living with our Lyve housing designs. At CyBe we believe that living - using a building - is about comfort, space, design and not to forget sustainability.

Besides, we see a building as technology rather than real estate and given the rapid developments in technology nowadays, housing designs can also be developed rapidly.

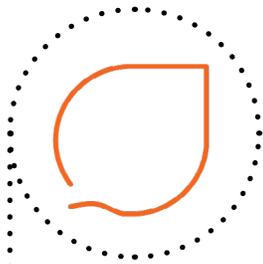
This goes beyond concrete printing since a building is an integral whole between elements such as the walls, floors, insulation and installations. Various housing designs are shown in this brochure such as a bungalow, row housing, semi-detached houses and patio housing.

The designs are of such an abstract level that they can be easily being adjusted with local building regulations and needs - standard customization!



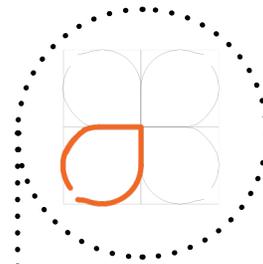
Wall

- Material efficiency
- Structural systems
- Modulation for printer reach
- Textures and finishes
- Built-in furniture
- Properties Insulation



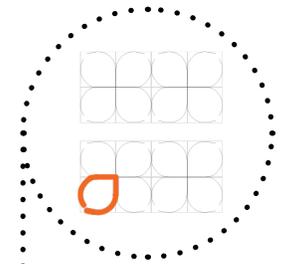
House

- General Program
- Design guidelines
- Normative of min. Spaces
- Flexibility
- House Evolution
- Building possibilities
- Replicability capacity
- Mix systems
- Building sequence
- Assembly handbook
- Collaborative planning



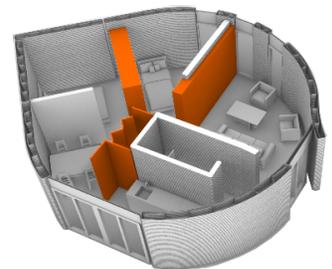
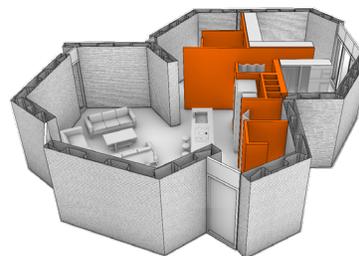
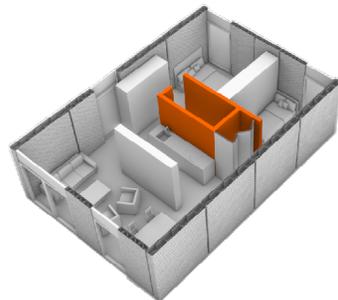
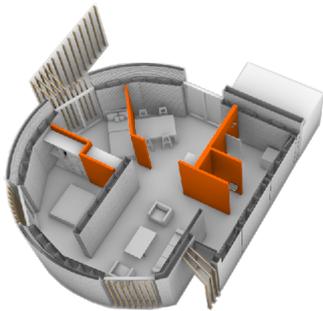
Neighbourhood

- Socio - Economic Composition
- Effective shapes
- Public - Private relations
- Green areas
- Parameters (1 to 100 houses)
- Replicability pattern
- Urban furniture
- Congruence, Generality, Accordance



Urban

- Urban determinants
- Urban Patterns
- Urban Equipment
- Neighbourhood composition
- Mobility
- Local normative of land use (green areas, commercial areas, leisure areas, etc.)



The CyBe Lybrary is founded with the purpose to stimulate and coordinate new construction methods - such as 3D concrete printing & parametric design. The ultimate goal is to not just gather information, but to share it.

“You can’t revolutionize an entire industry on your own. At CyBe, we work together.”

This digital platform functions to easily connect and support our global customers who use CyBe Construction Technologies by sharing experiences, knowledge, new developments and updates. The CyBe Lybrary runs on four stage principles, these four principles combined, result in an easy-access method of improving your 3DCP experience.



You'll gain access to the CyBe 'Academy' where we provide online 'remote learning' courses to teach you everything about all aspects of 3D Concrete Printing, from Operational and Design levels, all the way up to Strategic and Tactical levels.

Additionally, we provide a selection of our 3D Model/ Design library, where you can access frequently updated Printable models to simply download or adjust to your own desire through editable/parametric online design tools.

Furthermore, we are also providing software for a variety of purposes such as Printing Software, Modelling Tools to streamline your design process and increase productivity, as well as Parametric Tools which will iterate varieties of models, layouts and general construction methods.

On top of that, we provide a Knowledge base, where we keep, archive and maintain every document related to 3D Concrete printing and the CyBe systems. This includes, but is not limited to User Manuals, Maintenance Manuals and Tests with their results.

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Have fun, Be amazing, Stay happy and Live long!