# GREEN BIM

## DIGITAL SOLUTIONS FOR SUSTAINABILITY IN THE PRECAST INDUSTRY

Presentation by Ramon Steins

# \ PERSONAL INTRODUCTION

## RAMON STEINS

At ALLPLAN for over 9 years, I progressed from a Regional Sales Manager BeNeLux to the Director of Allplan Software in Singapore in 2022.

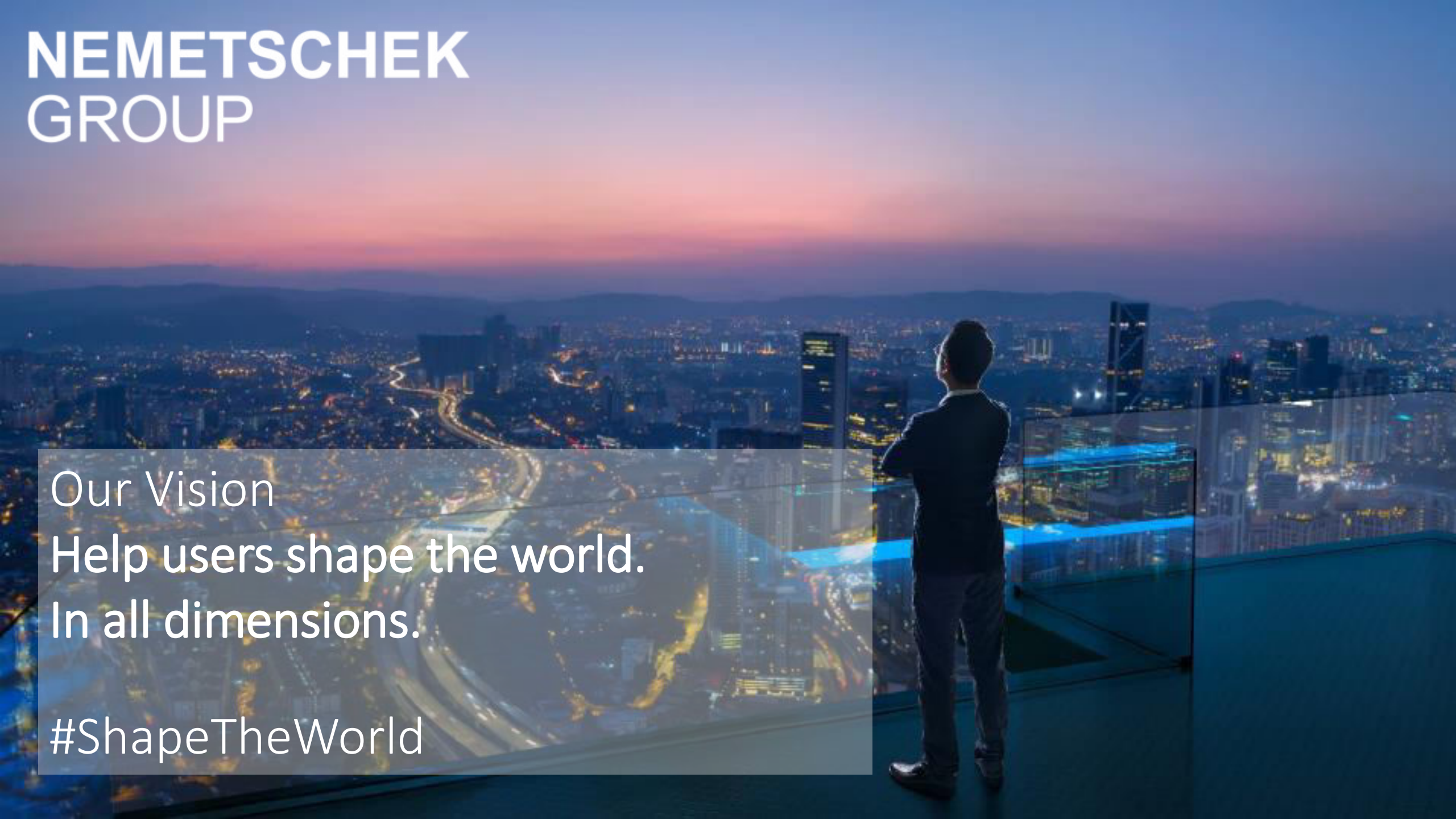
Currently, I'm the Sales Director for APAC, CEEMEA, BeNeLux, UK & the Nordics since January 2023.

Before ALLPLAN, I dedicated nearly 14 years as a BIM Specialist at Van der Werf en Nass BV in the Maastricht Area.

# \ AGENDA

- About ALLPLAN and Nemetschek
- Sustainable Building Life Cycle with BIM
- Planning Sustainable Buildings
- Sustainable Building
- Research
- Key Takeaways

NEMETSCHEK
GROUP



Our Vision

**Help users shape the world.**
**In all dimensions.**

#ShapeTheWorld

# SHAPE THE WORLD

Intelligent software solutions for AEC/O and Media & Entertainment


NEMETSCHEK GROUP®


4
CUSTOMER SEGMENTS
13 STRONG BRANDS
801.8
MILLION
EURO IN REVENUE
(Financial Year 2022)
GLOBALLY MORE THAN
7
MILLION
USERS
>3,600
EMPLOYEES
WORLDWIDE
NEMETSCHEK GROUP®

# NEMETSCHEK GROUP®

## PLANNING + DESIGN

Precise, innovative, and open planning and design workflows

ALLPLAN
GRAPHISOFT
RISA
SOLIBRI
VECTORWORKS

### NEMETSCHEK ENGINEERING

FRILO
SCIA

## BUILD + CONSTRUCT

Collaborative, efficient, and sustainable construction processes

BLUEBEAM
NEVARIS

## OPERATE + MANAGE

Smart, intelligent and comprehensive building management

CREMSOLUTIONS
SPACEWELL

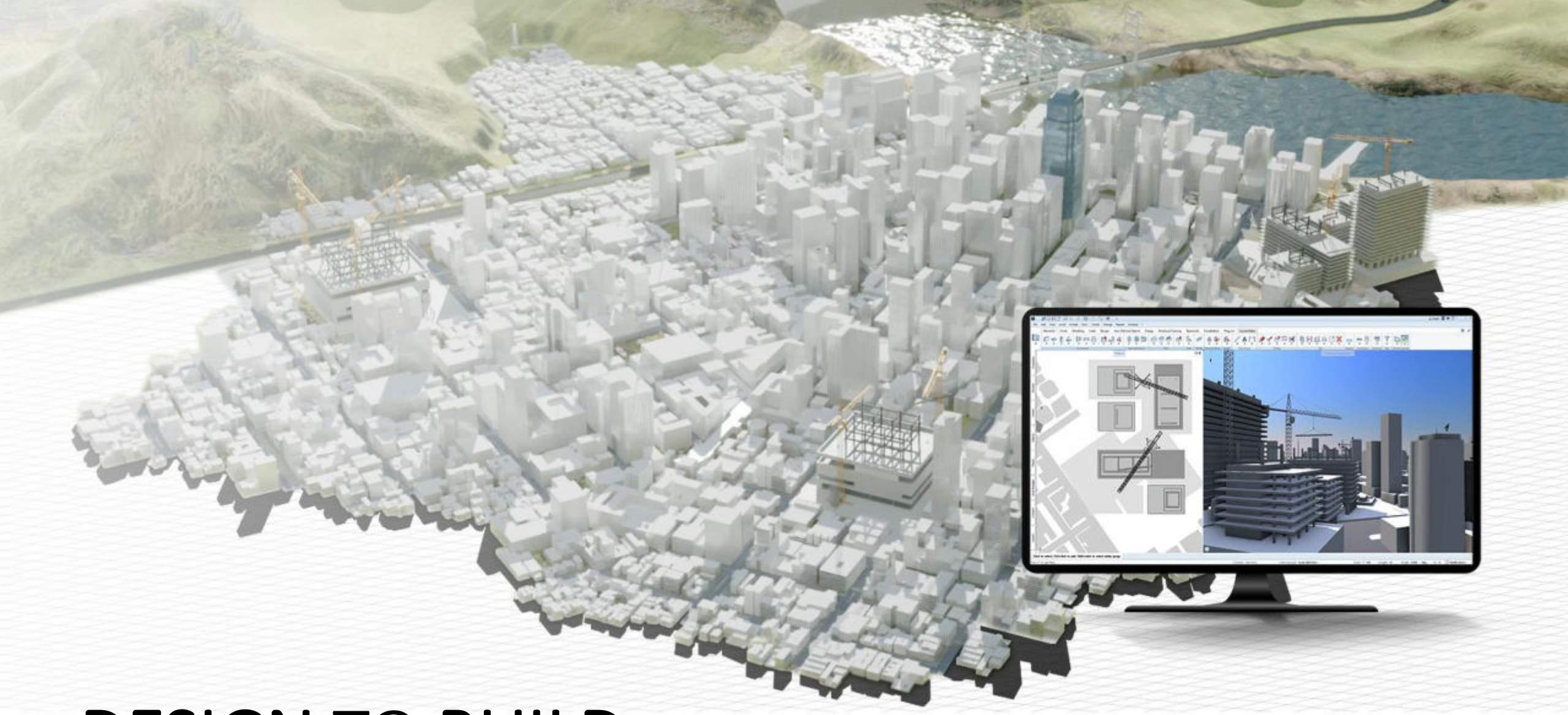
## MEDIA + ENTERTAINMENT

Creative, intuitive and powerful 3D animation

MAXON

## DIGITAL TWIN BUSINESS UNIT

dRofus



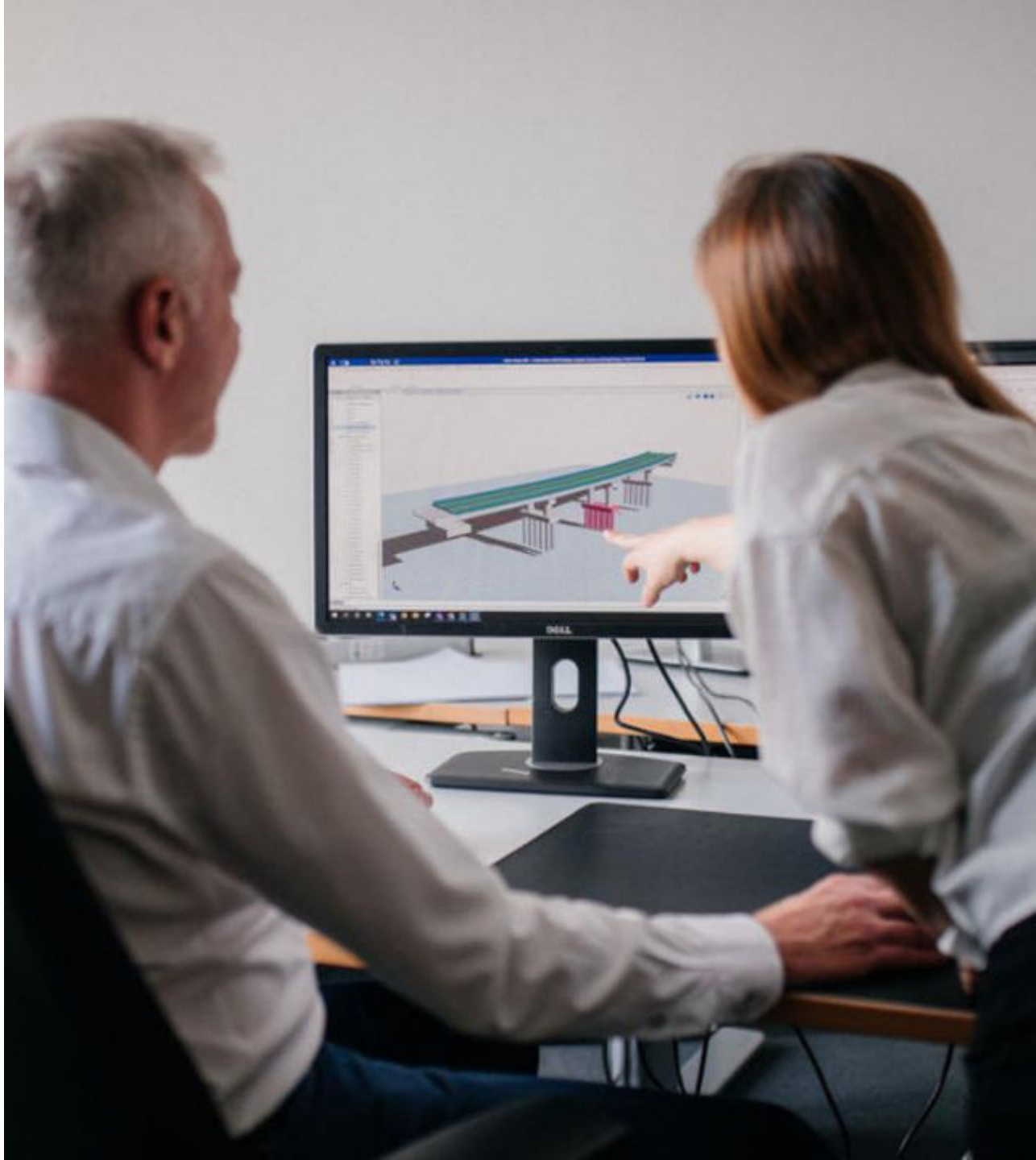
# DESIGN TO BUILD

**DESIGN SOLUTIONS** FOR A BETTER BUILT ENVIRONMENT

ALLPLAN
A NEMETSCHEK COMPANY

# \ TOOLS & INFORMATION TO MAKE THE RIGHT DECISIONS

- Highly accurate quantity take off, to **understand the costs or resource impact.**
- Powerful modeling, cloud-based collaboration, reporting and visualization capabilities to **make sure the right information is available**.
- Enabling straight forward and **transparent communication** with other stakeholders, including **fast iterations** between the architects and engineers or owners.



# \ LEVERAGING THE BIM MODEL ALL THROUGH CONSTRUCTION

- Enriching it over the time with lean **construction methodologies** and site construction assets, or safety considerations.
- Considering **buildability of the structure** or the infrastructure asset in the digital model - to a large extent - automatically added
- To **avoid surprises** on the construction site.

# \ DIGITAL TOOLS NEED TO BE EXTENDED TO PRE-FABRICATION

- It is essential to consider the **whole process chain** to make a real impact
- With our precast and steel technology we help to **streamline the full fabrication process**
- Supporting **multi-material buildings and infrastructure**

IT IS WORTHWHILE IN

**EARLY DESIGN**

**PHASES**

TO

**MAKE THE  RIGHT**

**DECISIONS**


CONSIDERATION OF THE **BUILDABILITY** OF THE STRUCTURE BY SUPPLEMENTING THE **DIGITAL MODEL**

# \ DRIVING OPEN BIM

The Nemetschek Group is a leader in developing and promoting OPEN BIM solutions and workflows to enable seamless and free collaboration of the different disciplines along the complete building lifecycle, regardless of their choice of software.

OPEN BIM™


DB Tower Frankfurt, Schmidt Plöcker Architekten; ©Lars Gruber

# \ WHAT IS OPEN BIM?

## A PROGRESSIVE, DIGITAL, FUTURE-PROOF APPROACH TO IMPROVE AEC INDUSTRY COLLABORATION

- **Connecting different stakeholders** involved in a building or infrastructure project.
- Exchange project information through **neutral, non-proprietary file formats**.
- **Open standards benefits everyone** creating, processing, importing or exporting BIM data.
- Throughout **all project phases.**

- **OPEN BIM creates a singular language**, **ensuring workflow transparency**, longevity and accessibility of data for built assets – ideally in real-time, cloud-based and from **one single "source of truth"**.


**OPEN BIM** is based upon open standards such as **IFC from buildingSMART**. ALLPLAN and the Nemetschek Group fully support buildingSMART's openBIM program. We are also fully dedicated to the high-quality standards defined by our OPEN BIM Charter and represented by our OPEN BIM logo.

# SUSTAINABLE BUILDING LIFE CYCLE WITH BIM

# \ CHALLENGES AHEAD

Rapid global change requires new methods to ensure the resilience of our cities.

# \ SUSTAINABLE BUILDING LIFE CYCLE WITH BIM


## Reuse

- Building renovation
- Reuse of components
- Material recycling

## Operation & dismantling

- Monitor energy consumption
- Structural Health Monitoring
- Optimize utilization efficiency

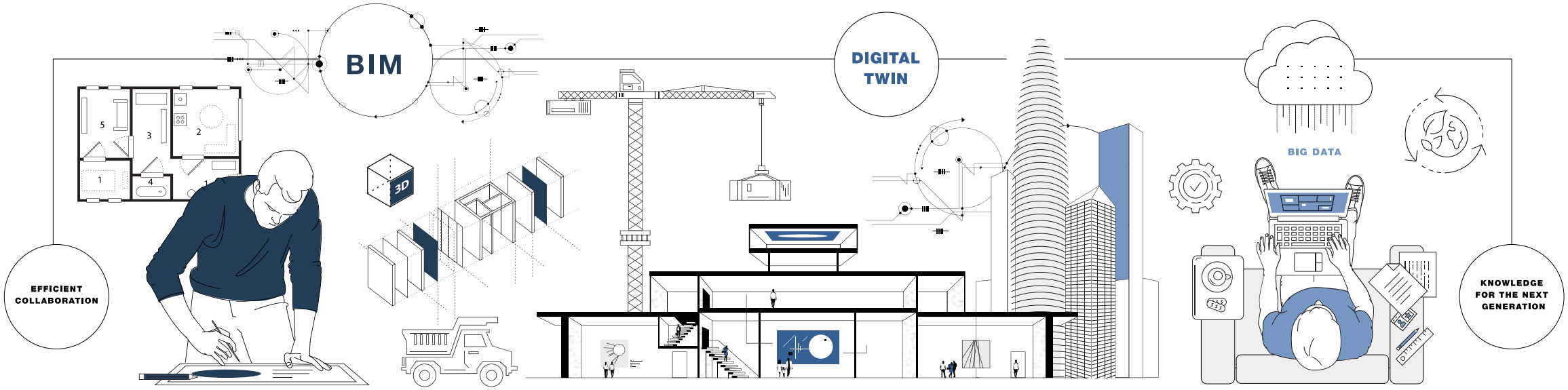
## Planning

- Life cycle assessment construction
- Building with renewable raw materials
- Reduction of the use of materials
- Life cycle assessment operation

## Construction phase

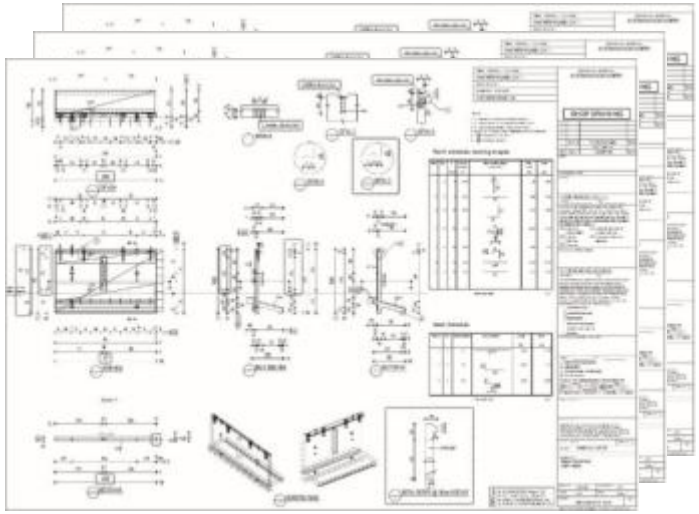
- Modular construction
- Shortage and waste prevention through BIM on the construction site
- Paperless construction site through BIM

# \ SOFTWARE SOLUTIONS FOR A SUSTAINABLE CONSTRUCTION LIFE CYCLE



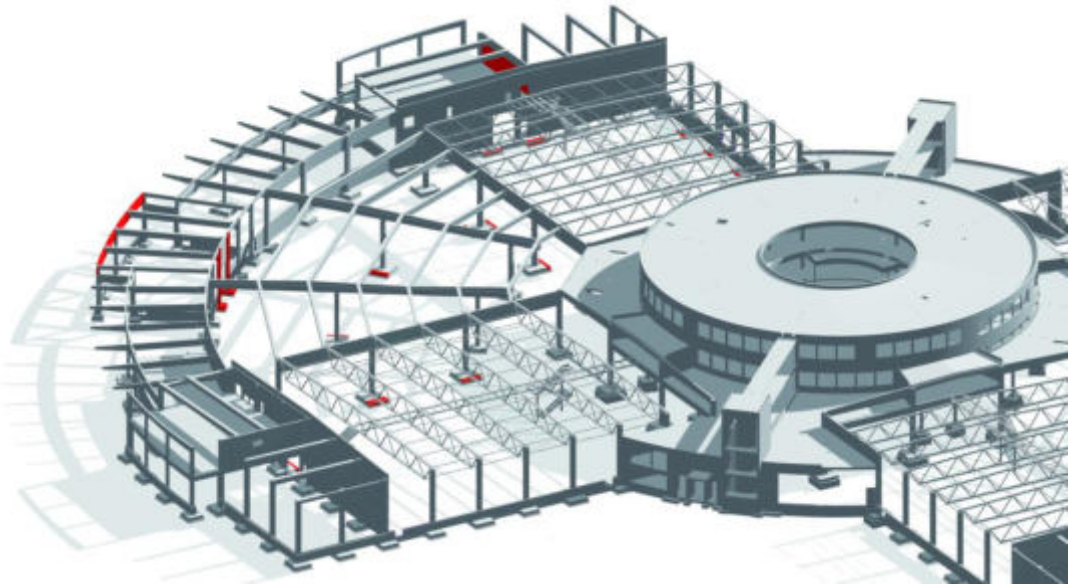

| PLANNING & DESIGN | | | BUILD & CONSTRUCT | | | | OPERATE & MANAGE | |
|---|---|---|---|---|---|---|---|---|
| PROGRAM MANAGEMENT PLANNING | MODELING & DESIGN DEVELOPMENT | STRUCTUAL DESIGN & ANALYSIS | DETAILING, ENGINEERING, CONSULTANTS, FABRICATION | QUALITY CONTROL, CLASH DETECTION | ESTIMATION & SCHEDULING | COLLABORATION & DOCUMENTATION | PROPERTY & MANAGEMENT | IWMS/ SMART BUILDINGS |

# \ ALLPLAN AEC



› One Solution for all dissciplines
from design to build

› Allplan is the multidisciplinary platform for AEC professionals that accompanies and integrates the design and construction process throughout all project phases.



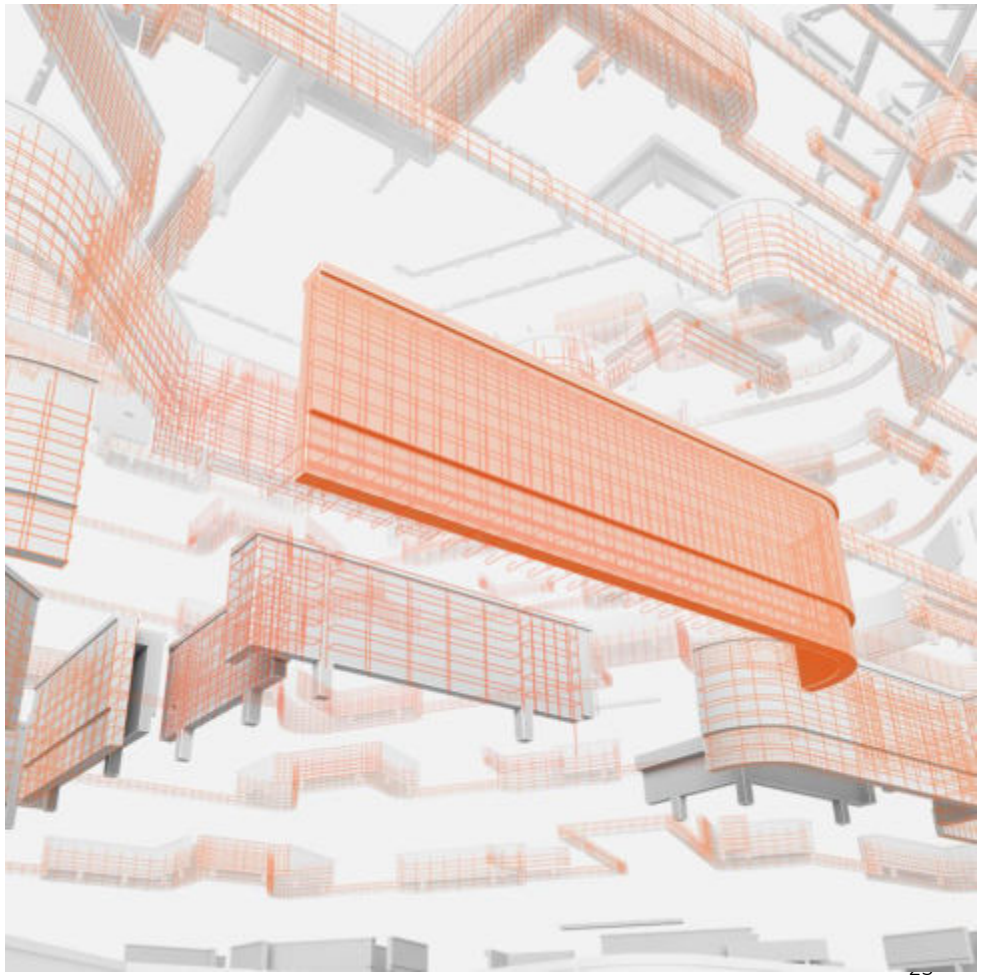
# \ ALLPLAN PRECAST

- ALLPLAN has 30 years expertise in Precast
- +600 Allplan Precast customers worldwide
- 150 Bill. sqm of precast concrete elements every year

- Key benefit of ALLPLAN's software:
  More efficiency, precision and flexibility for precast design and detailing

# \ ALLPLAN PRECAST

- Accelerate precast design and detailing processes with innovative software.
- Manage 50% more work thanks to unique automated workflows
- 2D/3D always consistent automatically - with Allplan's unique Elementplan-Technology
- Create shop drawings and reinforcement with a single click



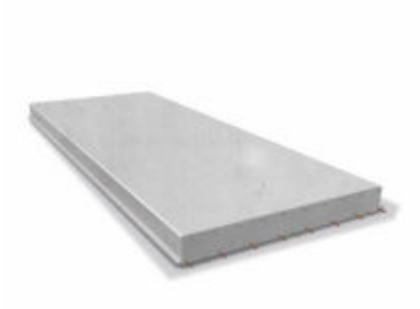
# PLANNING SUSTAINABLE BUILDINGS

# \ MODULAR CONSTRUCTION

# \ MATERIAL OPTIMIZATION

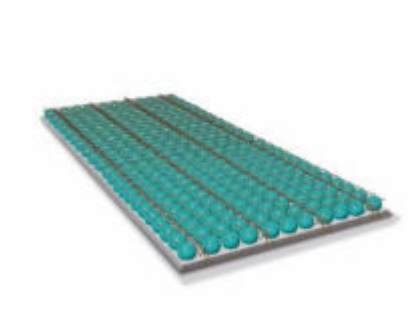
EFFICIENT MODELING
OF A LARGE NUMBER OF
IDENTICAL OBJECTS

# \ MATERIAL OPTIMIZATION

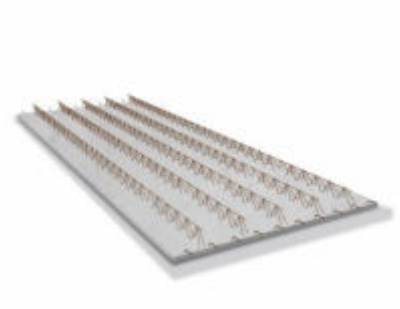


SOLID SLAB

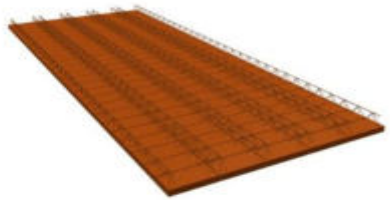
HOLLOWCORE – PRESTRESSED



BUBBLEDECK



GIRDER SLAB



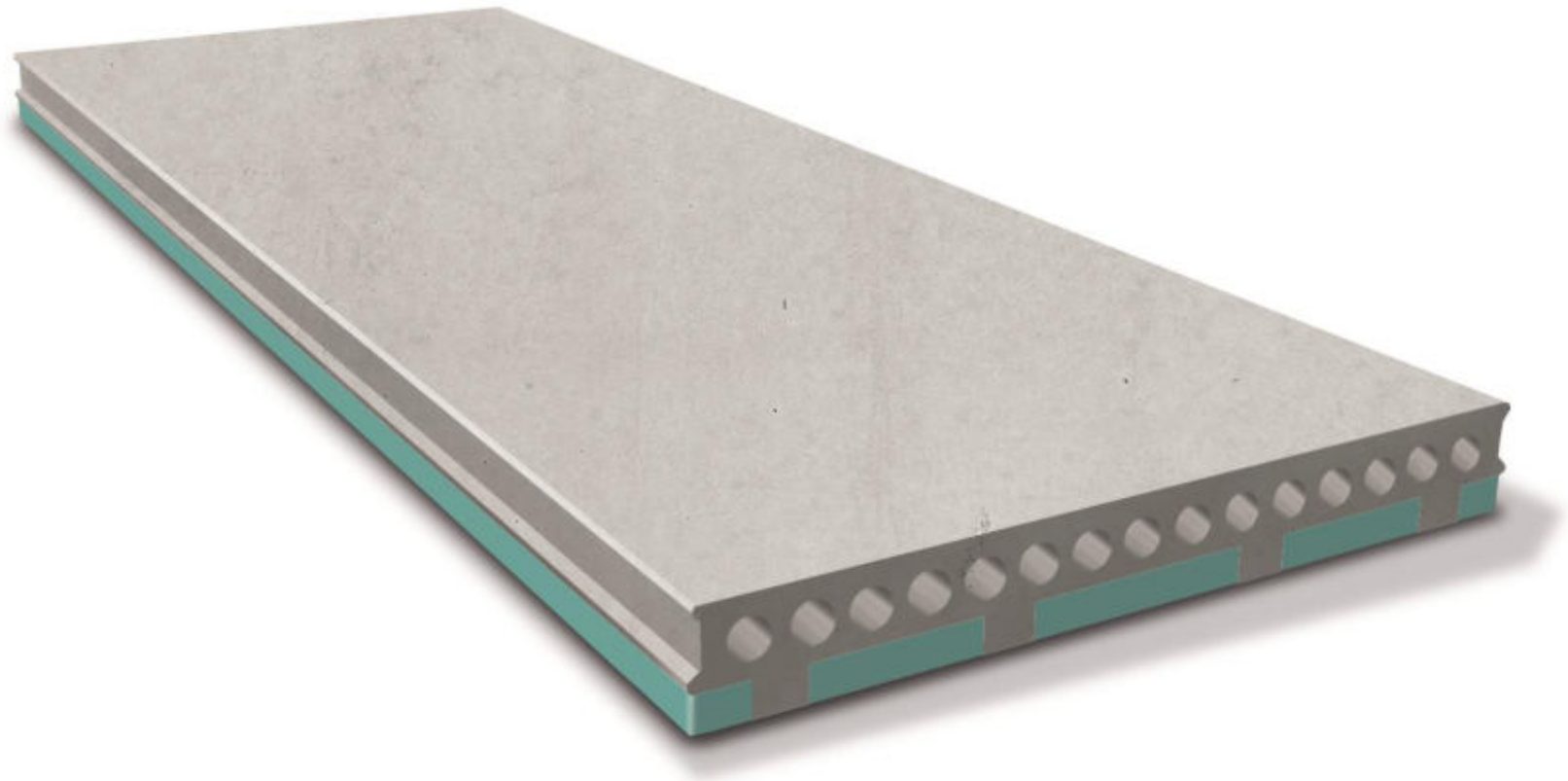
BRICK SLAB

BRICK SLAB WITH FILL

SOLID BRICK SLAB

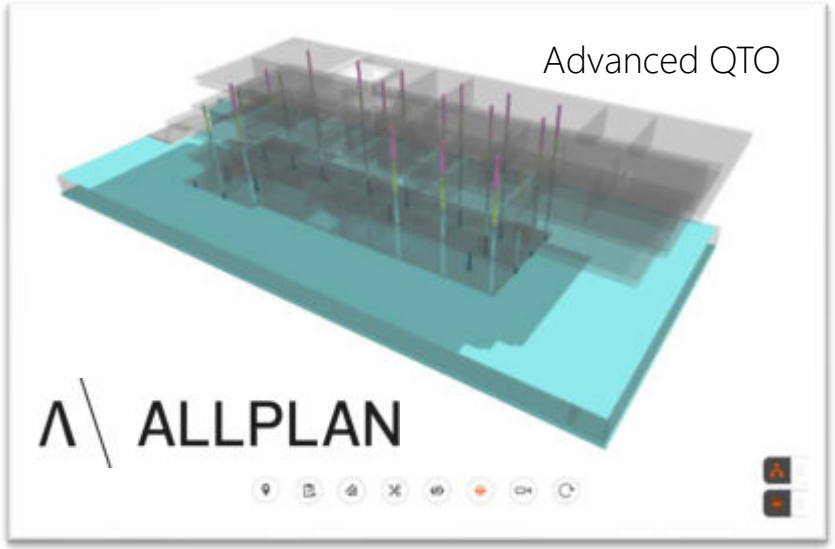
BRICK SLAB

# \ MATERIAL OPTIMIZATION – HOLLOW CORE



- 45 % less concrete
- 30 % less steel

# \ BIM BASED LIFECYCLE ASSESSMENT




National Material Data Base

Power BI

Design Assistance

CAALA

National LCA Tool

National Material Data Base

Detailed documentation

MEP

CO2e emissions

End of life

CO2e emissions

Use and replacement

CO2e emissions

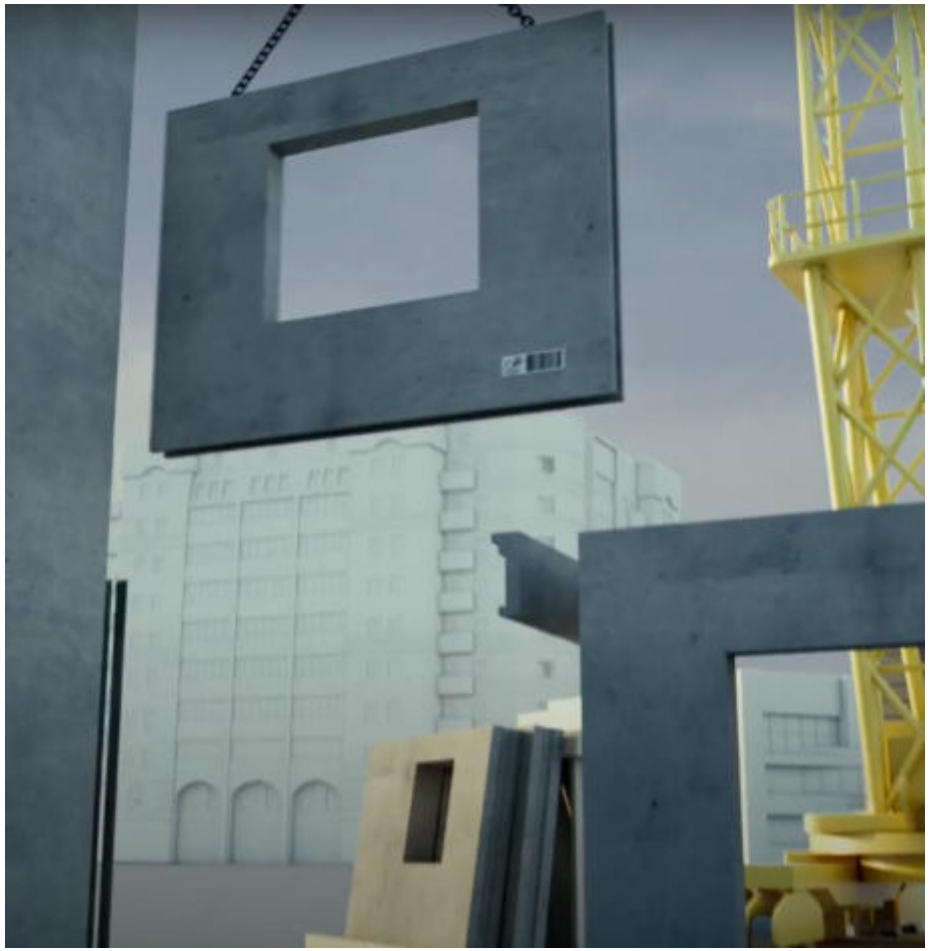
Raw materials Transportatio n Production

Absolute CO2e emissions of the construction

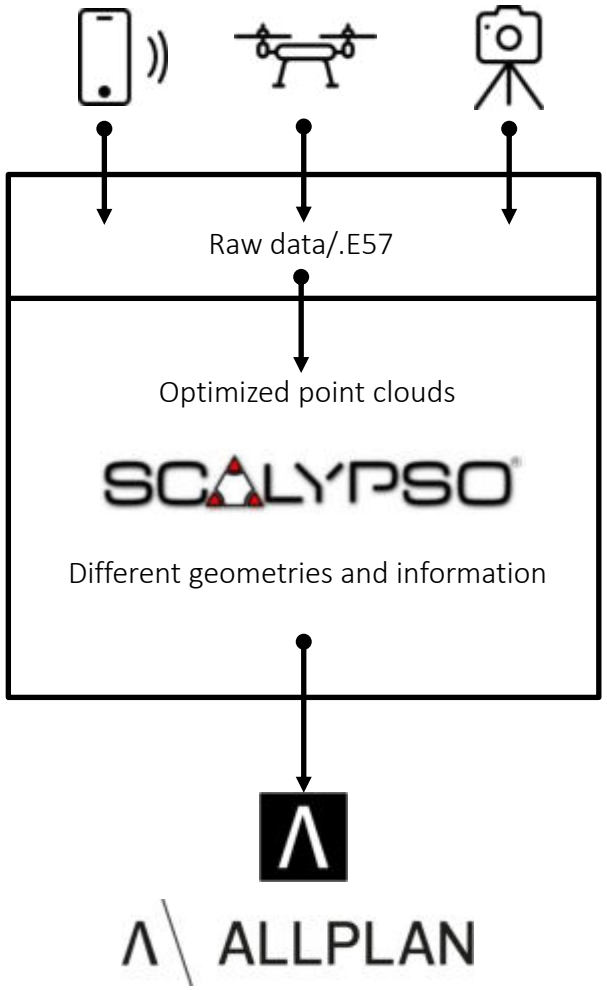
# SUSTAINABLE BUILDING

# \ EFFICIENT PRODUCTION AND LOGISTICS

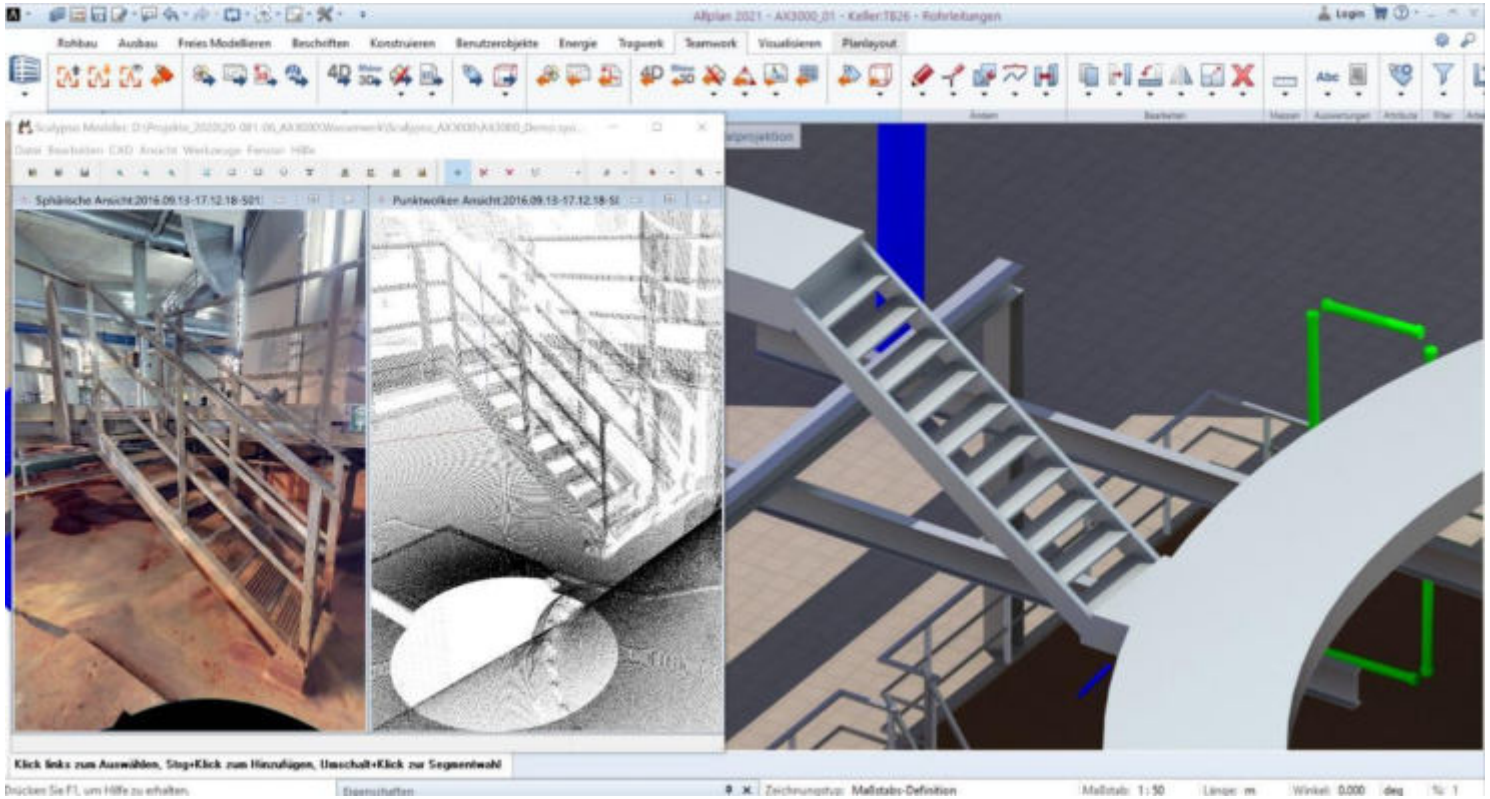
- 4D approach reduces the risk of errors and ultimately construction delays
- Process monitoring and visualization
- Process documentation
- Object identification with QR codes
- Construction progress documentation



# \ BIM BASED REFURBISHMENT

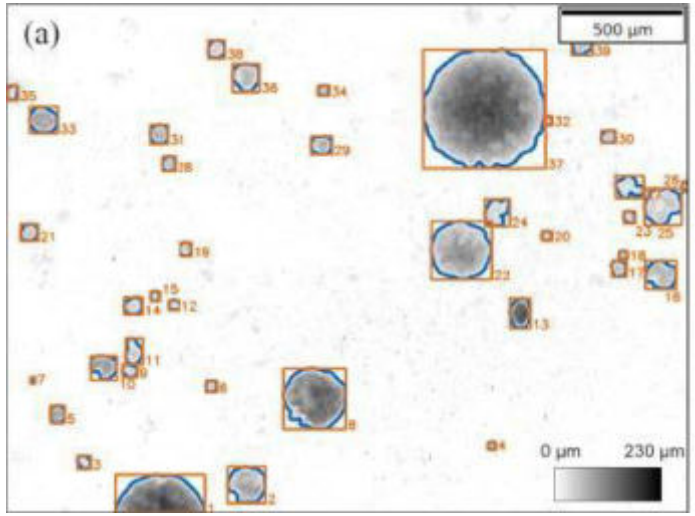


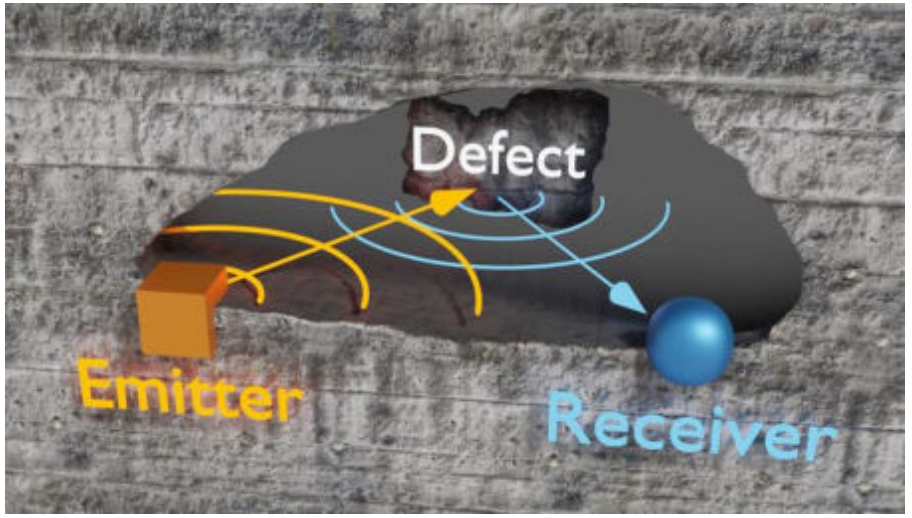

Scan2BIM digital building reconstruction from point clouds



# RESEARCH & VENTURE

# \ RESEARCH@NEMETSCHEK




NEMETSCHEK
INNOVATIONSSTIFTUNG

Georg Nemetschek Institute of the TU Munich

## AICC

- Machine learning based characterization of the air void system in concrete
- Prediction of degradation and deterioration processes due to gas and moisture transport mechanisms

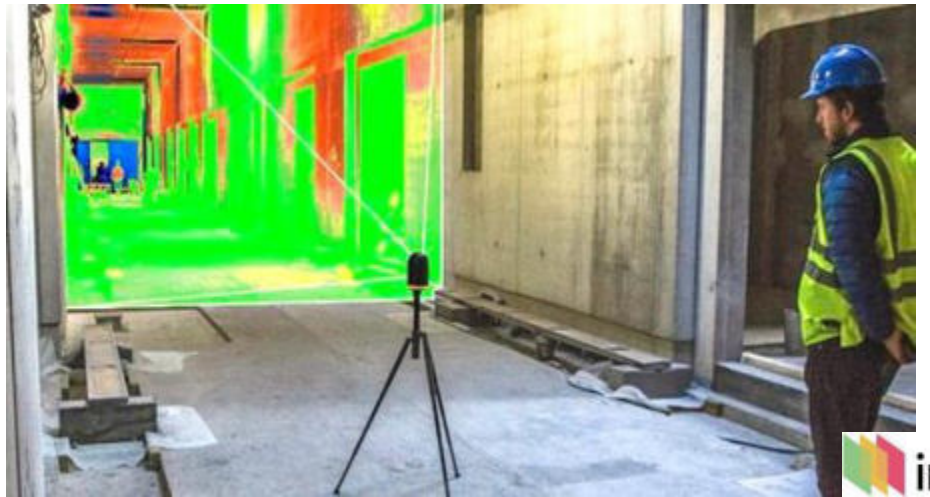
## DeepMonitor

- The end result of this project will be a data-driven, robust, and computationally efficient system for detecting defects in building components

# \ VENTURE@NEMETSCHEK

## Imerso – ML based quality assurance and documentation

- Holistic documentation of the construction site
- As built-As planned comparison: automatically compare construction execution with models
- Detection of collisions before they happen

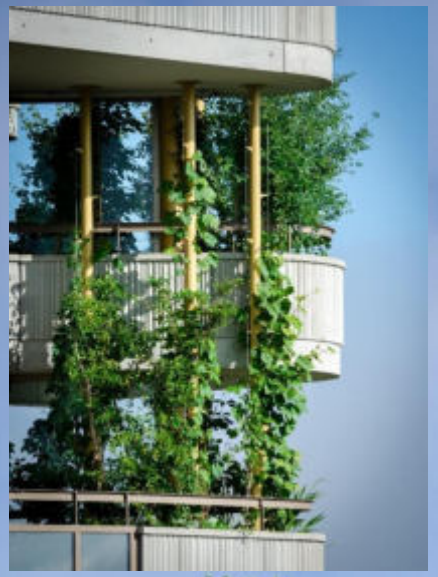



## Preoptima – ML based LC Optimization

- Compare thousands of AI and generative design created design iterations
- Reliably and efficiently report full life cycle assessment (LCA)
- Track carbon through construction, use and demolition stages

## Intensively greened facade with plant arches made of precast concrete elements

- Garden tower in Risch-Rotkreuz/Switzerland
- Office and residential building with 85 apartments
- 1,770 prefabricated parts planned and produced
- 824 layouts
- Precast project lead time (from commissioning to start of delivery): approx. 6 months
- Estimated time savings: 206 working hours



100% OF THE PRECAST ELEMENTS WERE DELIVERED ON TIME AND IN PERFECT QUALITY

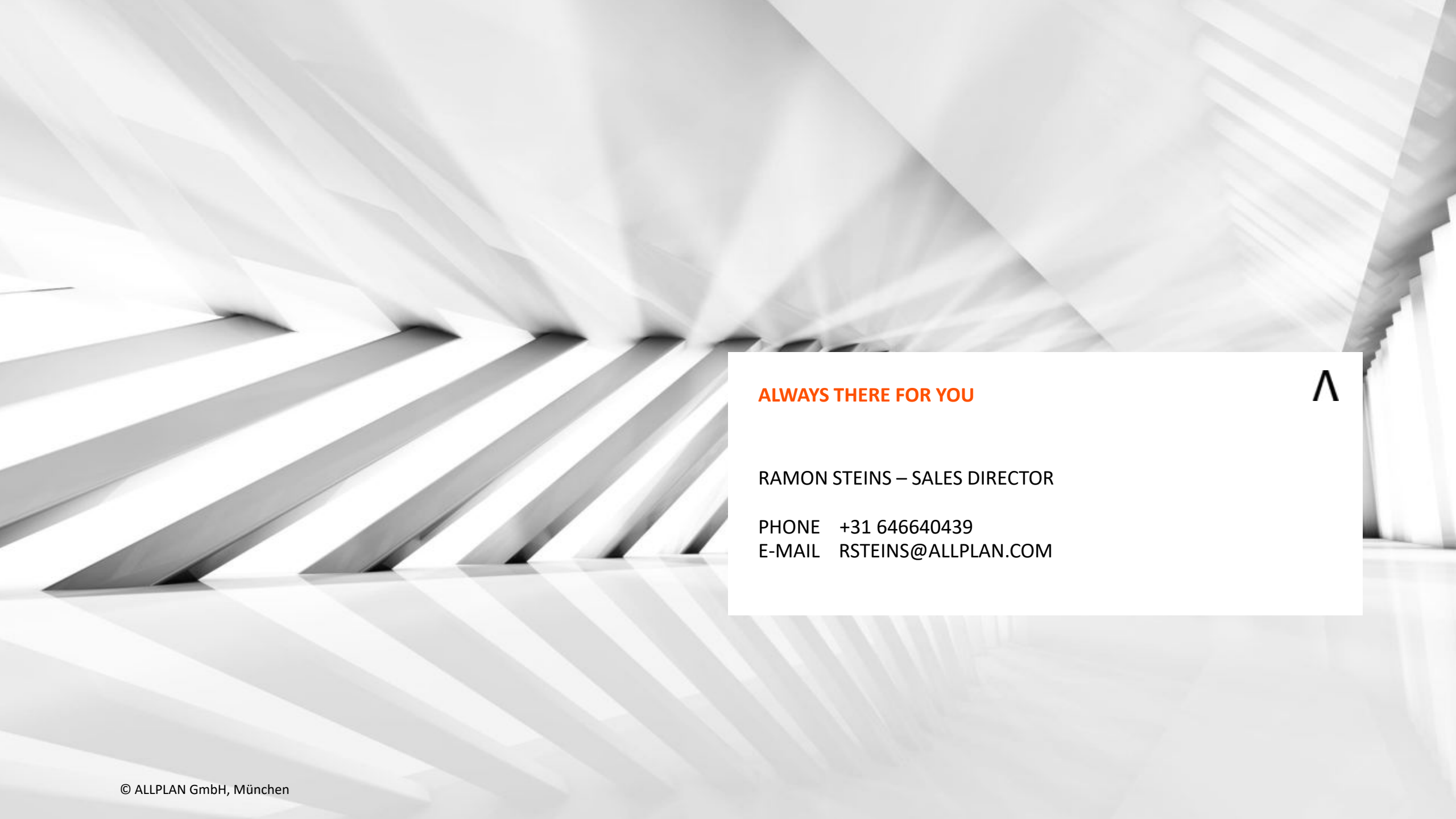
AGLAYA GARTENHOCHHAUS
NÄGELE BETONFERTIGTEIL- UND TRANSPORTBETONWERK

**A mixed-use development project combining housing, services, education and entertainment**

- Total floor area:  50,000 sqm, 18 floors, 3 base-ments
- 3D BIM-modeling of structural and rebar design and BoQ for structural works to support the tendering process
- Allplan enabled engineers to rapidly produce an accurate 3D reinforcement model, revolutionizing standard industry processes.

THE LONG BIEN PROJECT EXEMPLIFIES MODERN DIGITAL WORKFLOW, LEVERAGING ALLPLAN BIMPLUS FOR ENHANCED DESIGN EFFICIENCY AND COMMUNICATION.

MIXED-USE DEVELOPMENT PROJECT IN LONG BIEN, HANOI
HIMLAM BC JSC. VIETNAM



## ALWAYS THERE FOR YOU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