
BUILDEXT
EXTENDED BUILDING INDUSTRY

# BuildEXT

SOLUTIONS FOR BIM, ARCHITECTURE
AND ENGINEERING DETAILED DESIGN


## Our vision

BuildEXT Ltd. is a Hungarian architecture and engineering design company.
Our vision is to enable and elevate the digitization of the building industry, providing solutions that enhance the usage of BIM and other digital tools throughout the whole lifecycle of any building. We want to shape our own future by responsibly expanding engineering practices.

### Let's speak a common language using the BIM working method!

Our company has a strong culture of using and developing digital design methodologies, ranging from basic design software, analysis tools, CDE environments, combined with years of experience and expertise in architecture and MEP design.
Besides the high quality information delivery, we also focus on the usage of the information.
Making sure how it reaches the end user, how it can be utilized by them and how we can make sure that BIM based design is followed during construction and utilized in operation and maintenance.

### Digitally supported design

Our BIM workflows provide solutions to a variety of BIM or design-based challenges. They are proven in real world and highly customisable to our clients' needs in terms of language, documentation standards, information content and level of geometry detail.
Spatial analysis tools ensure high quality and proper model coordination between the models that make up the project.

We have years of experience in using BIM-based CDE environments such as Autodesk Construction Cloud, Revizto, Dalux to channel these into a model-based workflow. This allows us to integrate our solutions efficiently with our customers' systems.
In any projects, whether ongoing or new, we can set up and implement any digital ecosystem. We take great care to maintain the right flow of information and communication throughout the project lifecycle.

### BIM solutions for different areas

- Partial or multidisciplinary design and modelling in collaboration with the client and third party designers.
- Multidisciplinary conceptual design and analysis of new or renovated buildings.
- Detailed technical design based on conceptual designs and technical requirements defined by the client.
- Multidisciplinary construction documentation with BIM model, which can be both cloud-based and a dedicated CDE environment.

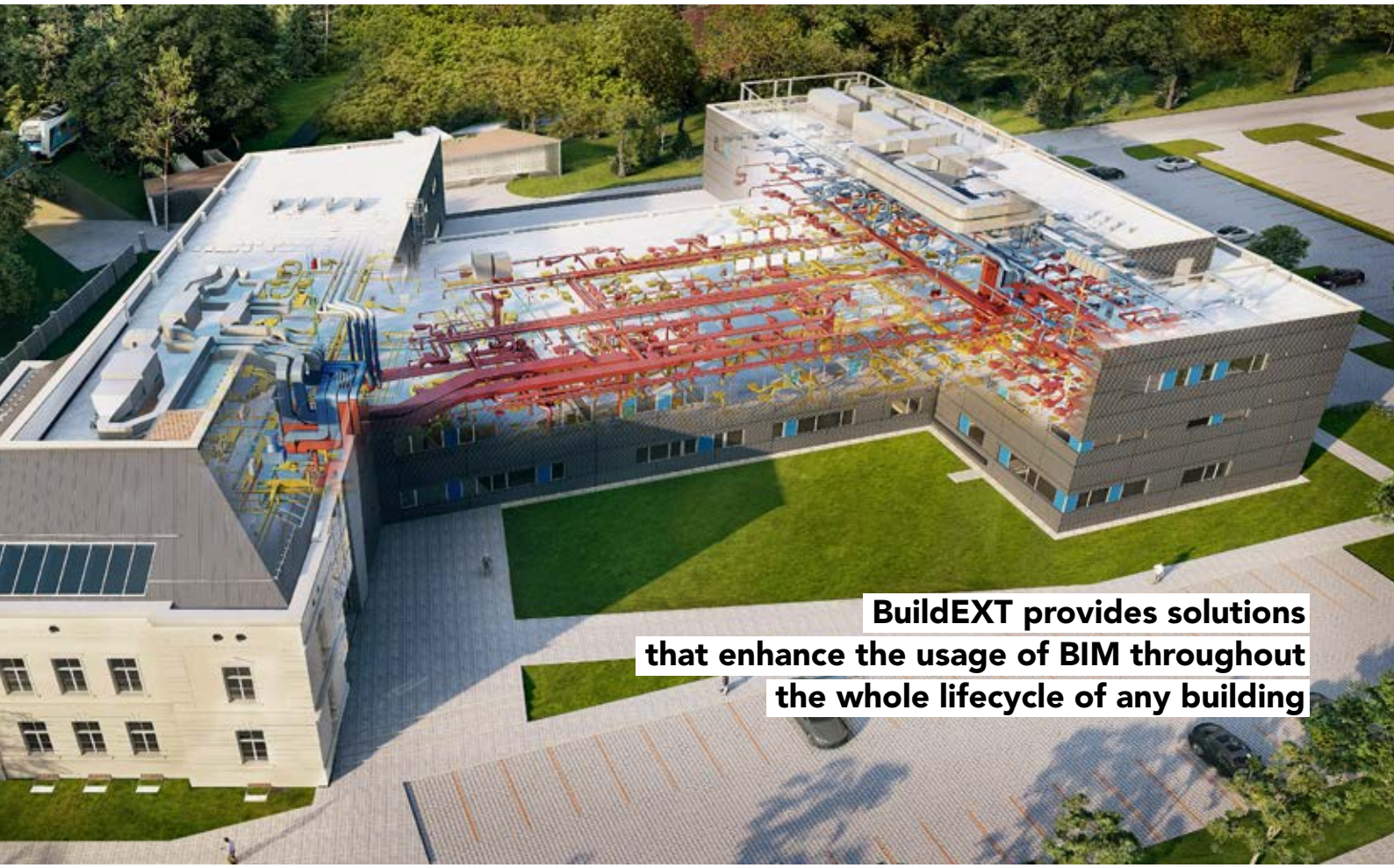
## Taking responsibility for our future

The key challenge in architecture today is the ability to consider the requirements of clients, users, and the environment, while being adaptable to changes throughout the life cycle of a building.

Effective communication between AEC stakeholders is crucial for achieving this. Together with our clients, users, colleagues and partners, we ask questions that lead to solutions that are relevant not only today, but also in the future.

**We believe that with our knowledge and passion we can make efficient, cost-effective, and eco-friendly projects across the whole digital lifecycle.**

Csaba Livják, founder and CEO of BuildEXT



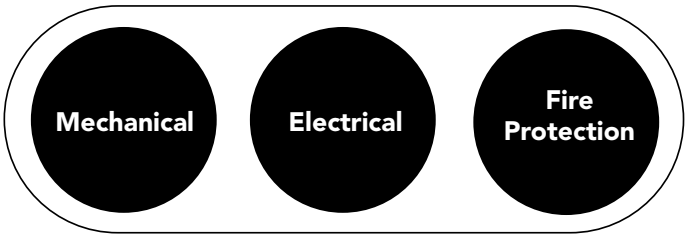
**BuildEXT provides solutions that enhance the usage of BIM throughout the whole lifecycle of any building**

# BIM Services

Our **ISO 19650** audited BIM services are available for large scale and complex industrial, commercial, office, and public building projects.

## SOLUTIONS FOR BIM AND ARCHITECTURE


## ENGINEERING DETAILED DESIGN - MEP




### CDE Solutions

Data environments are critical to any projects utilising BIM methodology. We'll help you find the CDE environment that's best suited to your project. We will set up the necessary configuration and get you up and running.

### BIM Consultancy

The specifications for BIM can be both complex and overwhelming. We want to take this burden off your shoulders.
We discuss informally your goals and expectations of BIM implementation, followed by a detailed breakdown of your requirements into complex specifications that serve as the guidelines for the project.

### BIM Services

From detailed architectural design in closed BIM, through quality control and quality assurance, to open BIM collaboration, our activities cover the entire BIM workflow. We are ready to carry out any sub-task or complete project requiring specific engineering skills.

### Mechanical Design & Modelling

Our role in BIM-based mechanical design is to ensure that mechanical content of the models is properly worked out down to the last detail. This includes various system calculations, bill of quantities, P&Id-s as well as the clash coordinated models. Combined with our CDE workflow, we can always provide the client with a transparent overview of the design development.

### Electrical Design & Modelling

In scope of electrical design, our aim is to provide plans and calculations as BIM model-related content. Similar to the mechanical solutions, the electrical design is treated as an integrated content, taking into account other disciplines.

### Fire Protection Design & Modelling

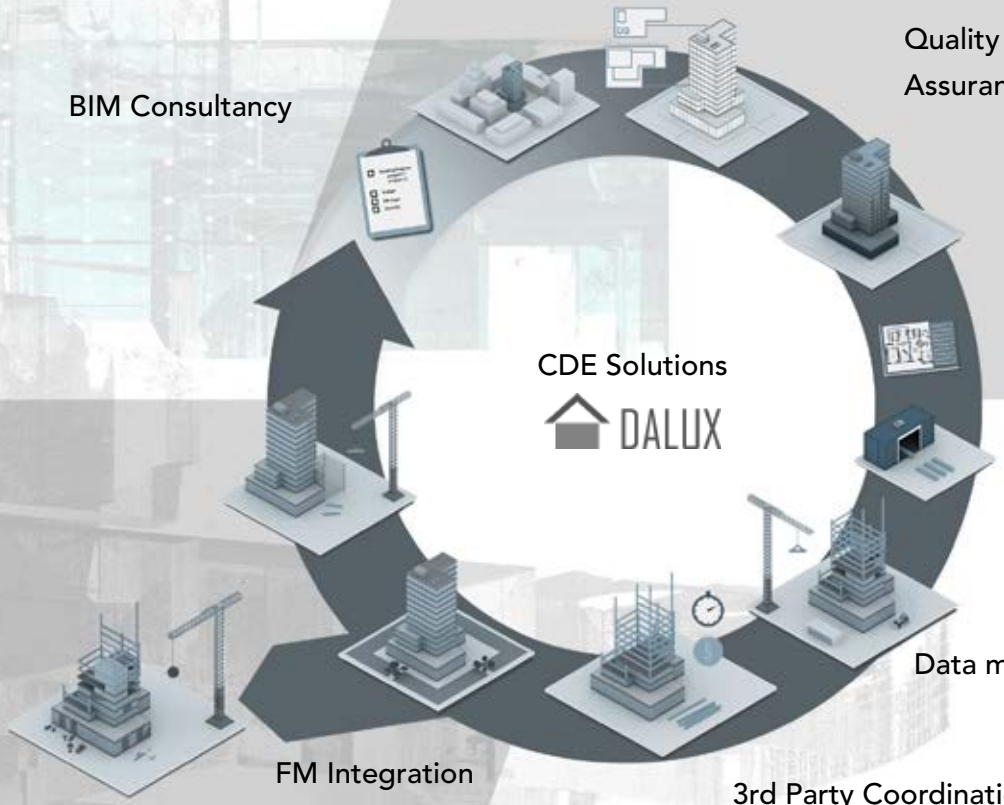
At BuildEXT we handle fire protection as discipline related BIM entities. Architecture, electrical and mechanical related fire protection disciplines. With this approach we can provide complex fire protection solutions in BIM.

Detailed Architectural Design

MEP Solutions

Quality Check and Assurance

BIM Consultancy




Data management

3rd Party Coordination

FM Integration

**Certifications**

BuildEXT posesses the ISO 19650 BIM Certification.
Our working methods also comply with ISO 9001 quality assurance standards.

ISO 9001:2015

SC simply certification ISO 19650 certification BIM

# Solutions for BIM and Architecture

Track and monitor the building's lifecycle in a proven methodology for open and closed BIM projects.

## CDE Solutions

**Common Data Environments** are critical to any projects utilising BIM methodology. They are designed to be the single source of truth, allowing all project participants to access and understand all BIM data. We guarantee that BIM data is accessible to all.

**Select CDE**
Depending on your BIM goals, we help you select the appropriate CDE solution for your project.

**Setup**
We ensure it is set up correctly, according to the project team's structure and necessary workflows.

**Training**
We provide training to all stakeholders on how to use the system effectively, enabling them to access relevant data without time-consuming searches.

## BIM Consultancy

### We prepare all the information for you

There is a widespread desire for BIM, but it is not always apparent why BIM is necessary or what benefits it can bring. The specifications for BIM can be both complex and overwhelming. We want to take off this burden your shoulders.

We discuss informally your goals and expectations of BIM implementation, followed by a detailed breakdown of your requirements into complex specifications that serve as the guidelines for the project.

This approach guarantees that your defined goals are met.

# BIM Services

## Closed BIM Revit Architecture

When using BIM methodology, it's best to avoid extensive data transformations as they can slow down the design process and lead to data loss.
Our closed BIM ecosystem guarantees that all key design stakeholders on a project have the ability to track and monitor the progress of other designers' efforts almost instantaneously, ultimately leading to less confusion and fewer hours spent on coordination meetings.
Combined with our CDE workflow, we can integrate design teams who are outside the closed BIM environment and project participants who are not using any authoring tools, such as inspectors, external advisors, and client representatives.

## Quality & BIM Workflow

Information model quality is continuously monitored throughout the project lifecycle:

- Model geometry with Revit alert management system and manual audits.
- Model information content with automated model checker software add-ins.
- Spatial coordination with Navisworks based clash detection.
- Documentation quality and content with view template system, automated information tag inspector scripts, naming conventions and document data control with model checker software and CDE control functions.

## Open BIM workflow collaboration

The key feature of our method that we are processing incoming data service and make a closed BIM counterpart model from with all the relevant data stored in.
We are able to create BIM data from various file formats such as AutoCad Dwg, Microstation dgn, Industry Foundation Classes IFC, or any other Open BIM based types.

## Quality Check & Assurance

### Clash Coordination

For clash coordination we use Navisworks combined with issue management software, so that the client, or even 3rd party designers, can have a common platform to observe and interact as the project develops towards its final stage.

### Void Management

Based on Revit families, combined with unique Dynamo Pyhton scripts we have developed a unique void management system for MEP disciplines to enable faster and better quality data management.

# Engineering
# Detailed Design - MEP

MEP details in closed-BIM ecosystem.

## Mechanical Design & Modelling

Design in accordance with international standards.

### Solutions and Workflow

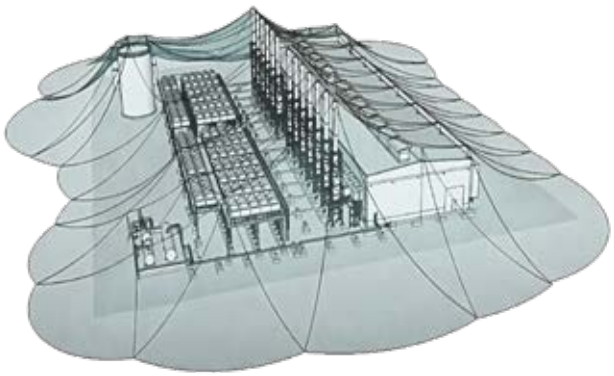
Our role in BIM-based mechanical design is to ensure that the mechanical content of the models is properly worked out down to the last detail. This includes the various system calculations, bill of quantities, P&Id-s as well as the clash coordinated models. Combined with our CDE workflow, we can always provide the client with a transparent overview of the design development.

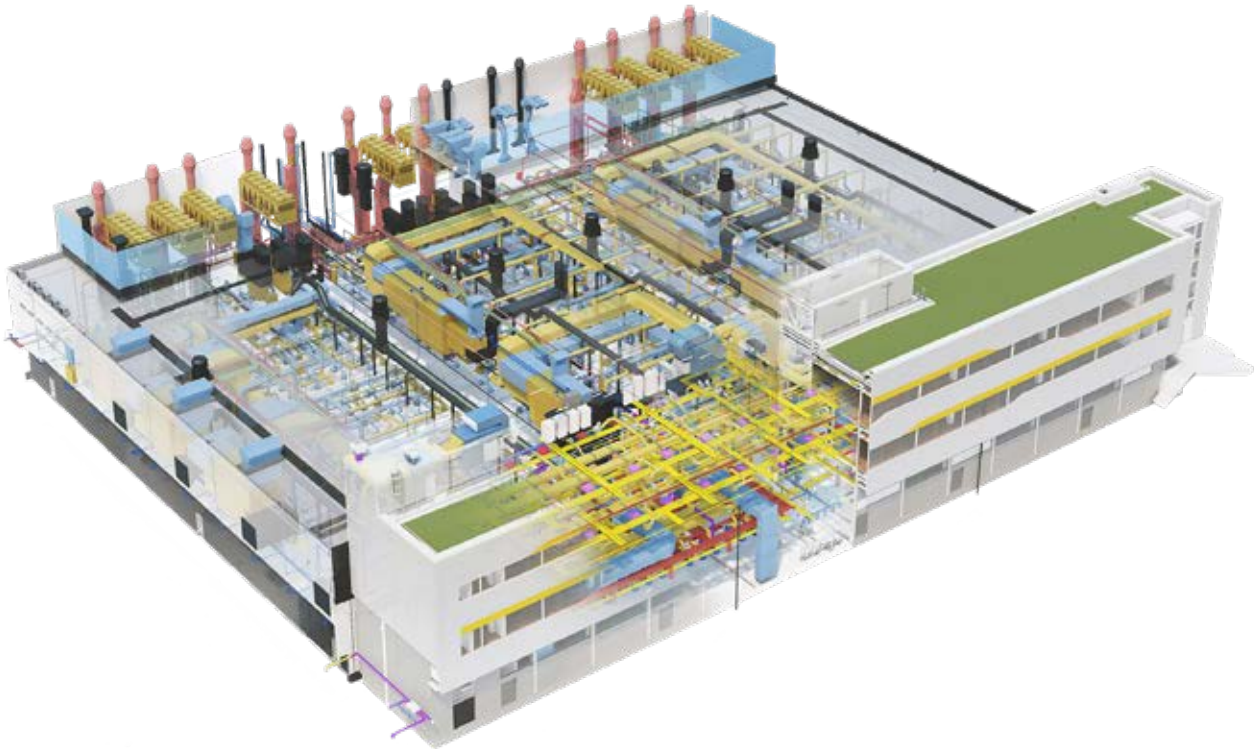
### Data Management

We use our own template systems to create all design data at its relevant location, from type to the last instance. Using a combination of Revit's built-in parameters and additional shared parameters allows us to create full models and designs at every stage of the process, from concept to as-built models. This also includes models optimized for facility maintenance.
This includes calculated design data, data sheets and any other necessary information. Our system is also flexible in terms of data management to meet client's requirements. To add extra details, model based calculations, preparation for simulation facility management uses.

### Calculations & Model based design scope

We are able to validate our designs and models according to international regulations and standards such as ISO, Ashrae, EN, FM, LEED.
Our calculation methods are integrated in our BIM based ecosystem.





# Electrical Design & Modelling

Complete data provision served from advanced Revit family template system.

### Solutions and Workflow

Based on electrical design, the main data in a project is stored in the closed BIM Revit. Similar to the MEC discipline, we provide complete data about the modelled or designed elements and systems during the project.
We also use a combination of Revit native functionality and advanced electrical design plug-ins. This gives us leverage in load calculations, circuit design, lighting design and earthing.

### Low Voltage

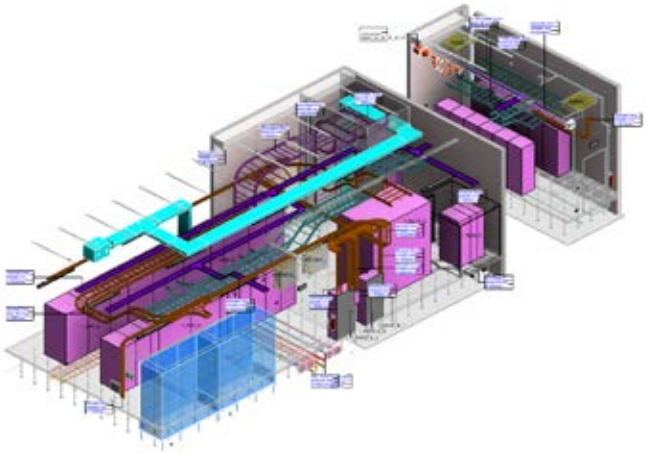
In the case of low voltage design, our scope of design starts from the site / power supply entry point of the building and goes all the way to the very last end point.
With a wide portfolio of electrical manufacturers, we can offer different solutions for any type of project in compliance with EN and ISO standards.
In terms of detail drawings we provide all in Revit. P&ID-s Main switchboards as well with countable equipment.

### Lighting Design

In scope of lighting design the two main factors are calculation and geometry.
In our own BIM approach, we create lighting design to fulfil electrical and interior design requirements as well.

### Earthing and Lightning Protection

Within the scope of Earthing & Lighting Protection, this kind of discipline related elements are hardly countable in quantity form in the industry.
BuildEXT has developed a workflow to support design calculation with actual earthing and lighting simulations. We have also developed a Revit family template system to make all the equipment related to grounding systems properly displayed and countable in 3D.

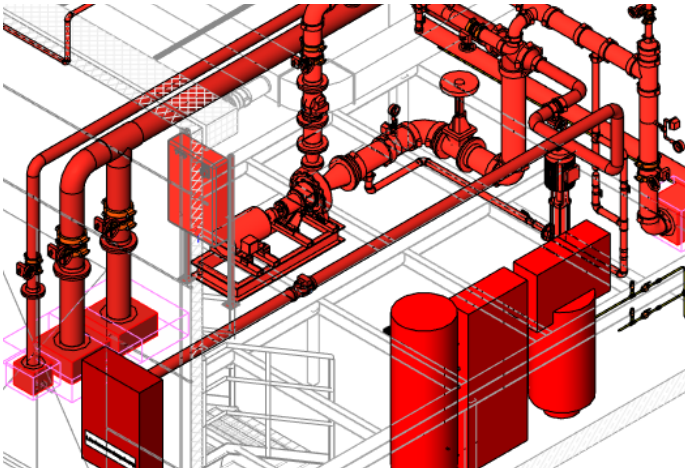


# Fire Protection Design & Modelling

Complex fire protection solutions with guaranteed data integrity and linked calculation moduls.

### Solutions and Workflow

Fire safety is perhaps the least addressed area of BIM and is also approached differently in various countries. To meet the needs of our customers, we have divided fire protection into 3 sub-disciplines.
Each BIM-based fire protection discipline entities have their own templates and Revit families. During a project design collaboration, each of them are taken into account to create complex fire protection. This goes from concept phase to the end of the design.



### 1. Architecture Fire Protection

Architecture based designs such as wall fire protection ratings, fire compartment data, fire hydrant hose length plans are placed in the Revit Architecture model.
The associated hazard classifications and fire alarm zoning are also placed in the architectural model.
Depending on the project requirements, this method can prove its worth both the third party design team and the client.
With this method, all fire protection information is available in the related building model without having to open the other related discipline containing the detailed design.

### 2. Built-in extinguishing systems

Built-in fire protection systems such as sprinklers are designed in a separate model.
Calculation modules are linked to the models. From detail design, P&IDs to zoning is presented in BIM environment.
Our solutions include sprinkler wet, and dry systems as well in VdS, FM, NFPA as well as local legislation requirements.

### 3. Fire Alarm & Detection

As it is mainly fire and electrical protection related, Fire Alarm & Detection also has a separate model during a project design to maintain data integrity.
With its own warehouse, template and prepared parameters, from BS to EN standards we are able to provide solutions.

**Continental site, Budapest**

# Hi-tech challenge in BIM workflow

## Continental's Budapest factory has all the developments available to make it one of the five Industry 4.0 flagship factories in Hungary.

Client: **Continental Automotive Hungary Kft.**
LOD: **300** Area: **3,480 m²**
Mechanical: **Comfort Heating-Cooling | Plumbing | Air Ventillation | VRV System**
Electrical: **Low voltage Systems | Earthing & Lightning Protection | Lighting Design**
Technology: **Kitchen technology**
Fire Protection: **Building Fire Protection | Fire Alarm Systems | Fire Hydrant System**
**Heat & Smoke Detection**

Continental manufactures electronics products for the world's leading automotive manufacturers, applying highly advanced and innovative technologies in many areas of automotive electronics.
It has several sites in Hungary, of which the Budapest site is planned to be developed in 5 phases. In the brownfield project BIM objectives included a special focus on the implementation of digital facilities management, therefore we worked in a BIM-based workflow throughout the project.

### Global automotive supplier

The Budapest plant's activities focus on the production of key systems for self-driving, electrically powered and internet-connected vehicles, such as electric control units, displays, drive, mechatronic and infotainment systems. On the customer side, we had to meet strict standards and expectations, which led us to make major improvements to our own BIM workflow and to our tooling.

### Scan to BIM

The quality of architectural work is greatly influenced by the availability of data, existing conditions and documentation. Therefore, we first created a point cloud of the entire site by laser scanning, and then built the BIM model based on the data set. This gave us an accurate picture of the exact, current condition of the building complex.

### Common Data Environment

We also had to deal with the different quality of the sectional plans of the existing buildings, the provision of data, the coordination of large model files and the software installation stop on the client side.
To do this, we created the conditions for a common data environment (CDE) based on the Dalux BIM construction management software.
During the project, we shared the multidisciplinary, federated model on this cloud-based, online platform.
The project participants were able to interactively follow the entire design cycle of the buildings in 3D.
Data sheets were added to the model elements, creating a digital twin that provides the basis for optimal facility management.

### Representative interior

In addition to the engineering challenges of complex industrial solutions, we were proud that our interior design team was also given an important role in the development plans for the headquarters.
We had to design high quality office and community spaces to meet representative needs. And perhaps the most exciting part of the project was the design of a meeting room and associated roof terrace in a steel-framed glass-fronted cube on the upper level of the headquarters.


1.

Services: **General Design**
**Project Management | Scan to BIM**
**BIM Services | Interior design**
Function: **Industrial building | Office**

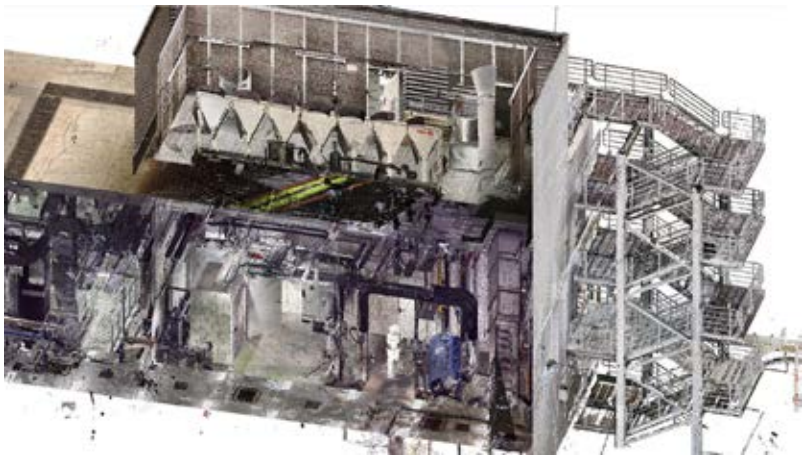
2.

# 5 years, 5 phases. Complete factory development for one of the world's leading automotive companies.

1. Visualization of the main building's entrance

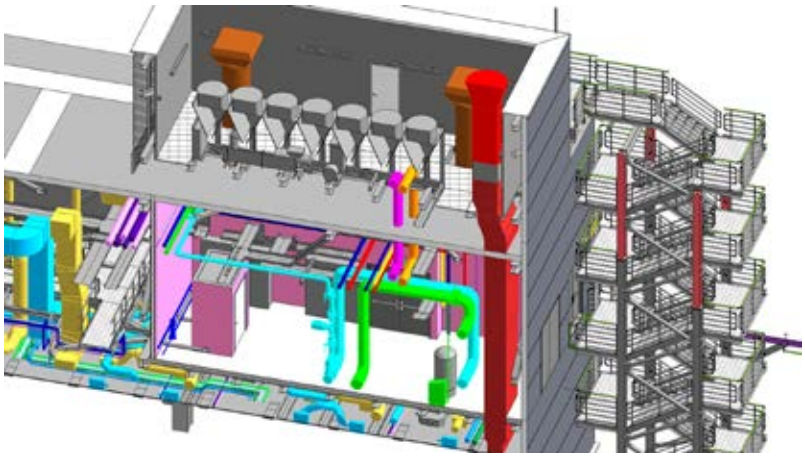
2. Digital model of the complete site with a fully automated high-bay warehouse in the background

3-4. Point cloud and detail of the model



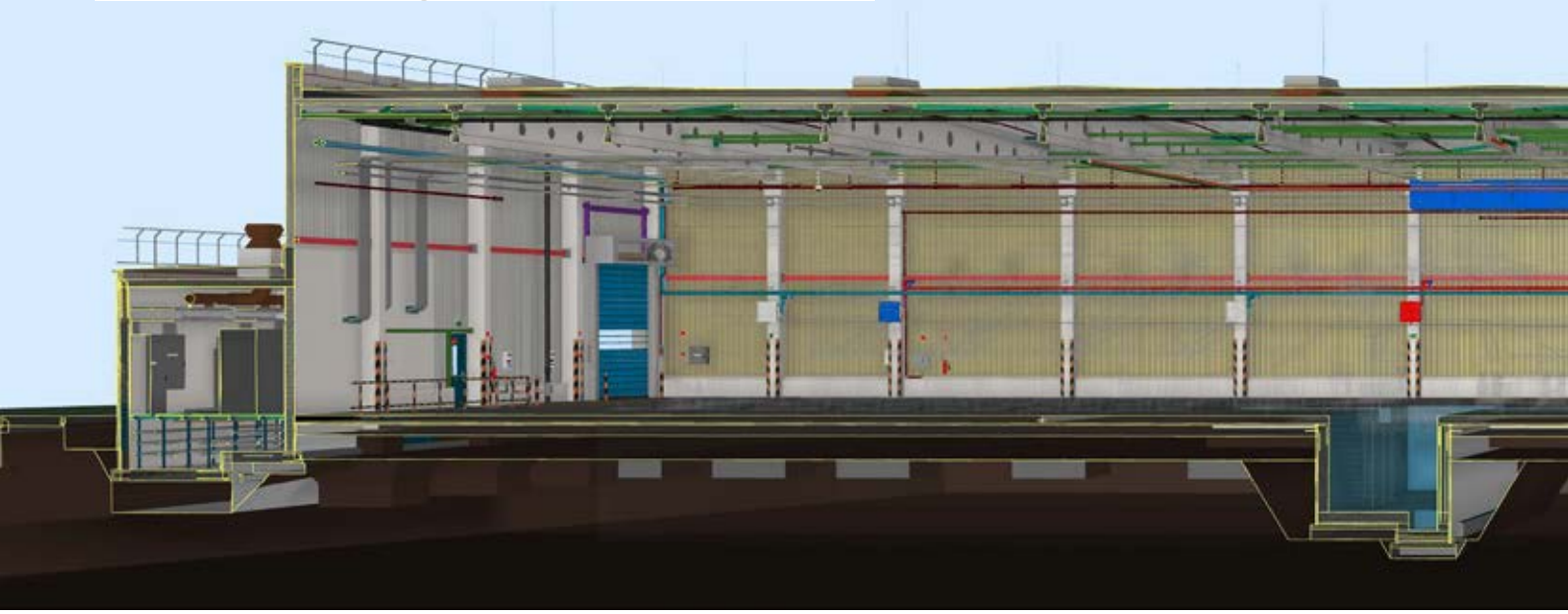
3.

4.



**Tyre manufacturing plant, Nyíregyháza**

# Brown-field investment in factory expansion



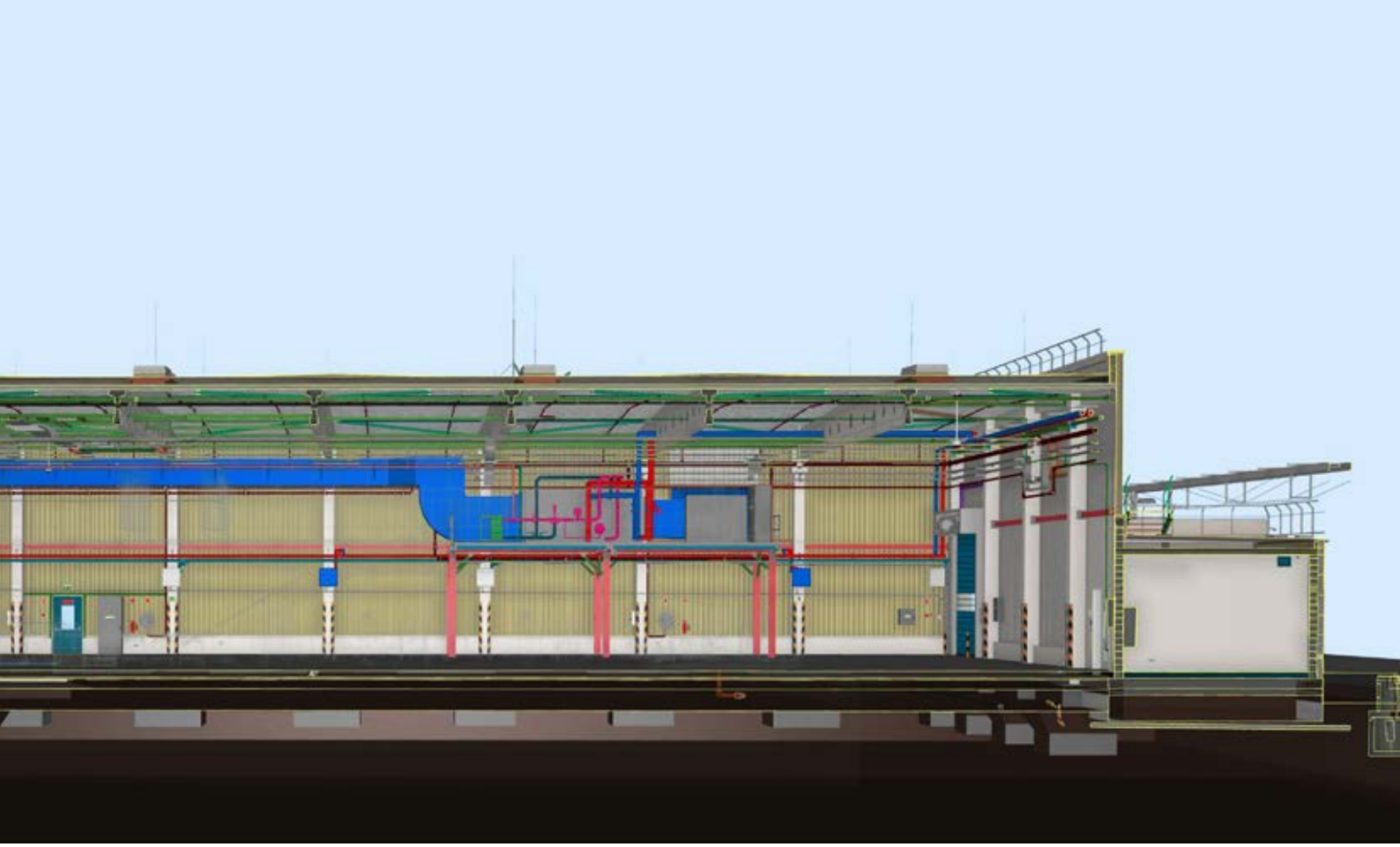
Michelin's local company extends its existing factory building due to a change in technology.

Client: **Michelin Hungária Ltd.** LOD: **400** Size: **5,000 m²**
Mechanical: **Comfort Heating-Cooling | Plumbing | Air Ventillation**
Electrical: **Low voltage Systems | Earthing&Lightning Protection | Lighting Design**
Technology: **Compressed air system**
Fire Protection: **Building Fire Protection | Fire Alarm Systems | Fire Hydrant**

**Design & Build project**
According to the investor's internal regulations, the contractor is responsible for the design & build. BuildEXT was commissioned to prepare the general design and the corresponding model.

**BIM strategic goals**
- Identification of the client's BIM usage objectives and setting up the requirements to achieve them
- Standardising the models required to complete the project and the processes required to create the planning documentation
- Reducing the environmental impact by making use of virtual construction processes (design and construction simulations)
- Decreasing the cost by using more efficient and more detailed decision support methods and by more efficient coordination between the participants of the project
- Visual display of the construction site's properties to assist with the design
- Accurate, model-based budgeting and cost estimating
- Use of clash-free models to avoid on-site problems;
- 3D model-based coordination, plan review, reporting and decision preparation
- Compiling high-quality construction design documentation to assure that the cost does not increase
- Building constructability has been verified on a model basis before the design documentation is issued

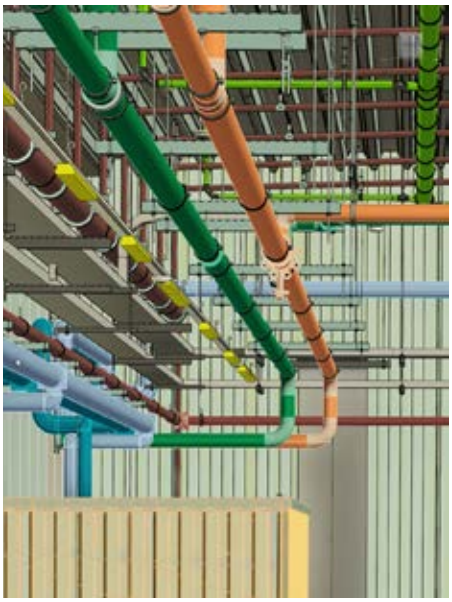
**2.**



Services: **Architectural Design | MEP Design**
Function: **Manufacturing plant**

1. Detail of the LOD 400 model

2. CDE use in the field, model verification via augmented reality



**1.**

**Software used**
- Revit – Architecture, Building engineering, Electricity supply, Low voltage electricity, Building Automation, Public utilities, Fire extinguishing system,
- Tekla - Statics - reinforced concrete, steel

**Indirect connection with the design model:**
- AutoCAD - Road&Surface
- Solid Edge - Technology
- Navisworks - BIM coordination

**No planning connection**: Occupational safety
**Open BIM platform**: Dalux Box Pro
**Closed BIM platform**: Revit

## BIM usage goals

Creation of a model of the central building affected by the design for all relevant disciplines.
Expectations of model usability:

- Document all design phases based on the model's information content, as per the current national regulations
- Improve the quality of coordination and communication within the project
- Prepare quantity reports
- Detect clashes and create solutions for spatial coordination
- Prepare a solar exposure test.

For future requirements, the model should be suitable for :

- Other simulations affecting the operation of the building (e.g. solar study, thermal inspection, construction time simulation)
- BIM-based construction coordination on site;
- For an implementation model that can be further developed after the execution design phase.

Following the design, the designers of the relevant disciplines (BIM participants) participated in a model-based cooperation in real time. All disciplines were part of the central model.

## Fit to Open BIM & Closed BIM

During the project, it was important for the designer to create a flexible digital ecosystem that is able to integrate additional project participants at any time, thus defining and developing a system that simultaneously enforces the principles of open BIM and closed BIM. The default common language for the model-based communication - just as the form of internal data provision - consisted of the .rvt, .ifc and .dwg file formats.

Logistics park, Páty

# Scanning & modelling of a complete logistics park

In the scan to BIM project for the M1 logistics centre of Prologis, 100% of the existing buildings and its surroundings were mapped in Unified National Projection (EOV) coordinate system with an accuracy of 10 cm.

Services: **Scan to BIM**
Function: **Logistics building**

Client: **Prologis Hungary Management Kft.**
LOD: **300** Size: **67,000 m²**
Mechanical: **Plumbing | Air Ventillation**
Fire Protection: **Sprinkler system**

**Strategic BIM goals**

- Create accurate BIM model suitable for further design developement
- Identification of the client's BIM usage objectives and setting up the requirements to achieve them
- Standardising the models required to complete the project and the processes required to create the planning documentation
- Defining a uniform, clear and reusable database structure in line with the project goals
- Visual communication of building site conditions to the design team and for EHS requirements compliance
- Accurate spatial and temporal scheduling
- Accurate, model-based budgeting and cost estimating
- Use of clash-free models to avoid on-site problems
- 3D model-based coordination, plan review, reporting and decision preparation
- Compiling high-quality construction design documentation to assure that the cost does not increase
- Building constructability has been verified on a model basis before the design documentation is issued
- The BIM model is prepared to meet the requirements of building management systems

**2.**

# Information model prepared for Facility Management System

1.

1. Aerial view of the logistic park
2. BIM model matched with the pointcloud
3. Complete pointcloud based on photogrammetry

**BIM usage goals:**

- A BIM model based on LiDAR point cloud to serve as the basis and database for the existing facility management system
- We harvest the linked pointcloud model to create accurate geometry. Then we fill the model with the appropriate data content.

During the design phase coordination and collaboration is based on real-time linkage to the multidisciplinary BIM model. In this closed BIM project all disciplines used Revit.

The information content of the model elements was provided by the customer as data.

3.

# Swimming pool project according to ISO 19650

The project was subject of an assessment carried out with reference to ISO 19650. The project passed the surveillance audit with no minor findings and not even recommendations for improvement.

LOD: **300-350** Area: **1,335 m²**
Mechanical: **Comfort Heating-Cooling | Plumbing | Air Ventillation**
Electrical: **Low voltage Systems | Earthing&Lightning Protection | Lighting Design**
Technology: **Pool technology engineering**
Fire Protection: **Building Fire Protection | Fire Alarm Systems | Fire Hydrant System**

**Purpose of the project**
To establish an independent training pool for the local high school.

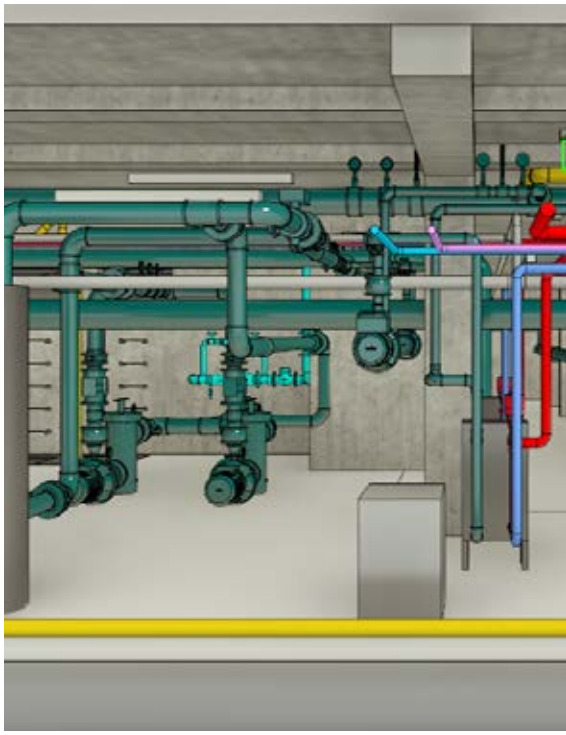
Compared to its funcionality, the planned facility was to be implemented within a very tight budget. Therefore, the main goal related to its design was the demanded function, cost-effective solutions and sustainable operation.

**Strategic BIM goals**
- Identifying the client's BIM usage goals and setting up the requirements to achieve them
- Standardising the models required to complete the project and the processes required to create the planning documentation
- Defining a uniform, clear and reusable database structure in line with the project goals
- Reducing the environmental impact by making use of virtual construction processes
- With a more efficient model content decreasing the cost and time of design collaboration
- Visual communication of building site conditions to the design team
- Accurate, model-based budget and cost estimation
- Use of clash-free models to avoid on-site problems
- 3D based coordination, plan review, reporting and support for decision-making
- Compiling of high quality deployment design documentation to guarantee unincreased acquisition costs
- Prior to the issuance of the design documentation, feasibility of the building has been verified on a model basis
- Application of ISO 19650 standard practices during project management

**1.**

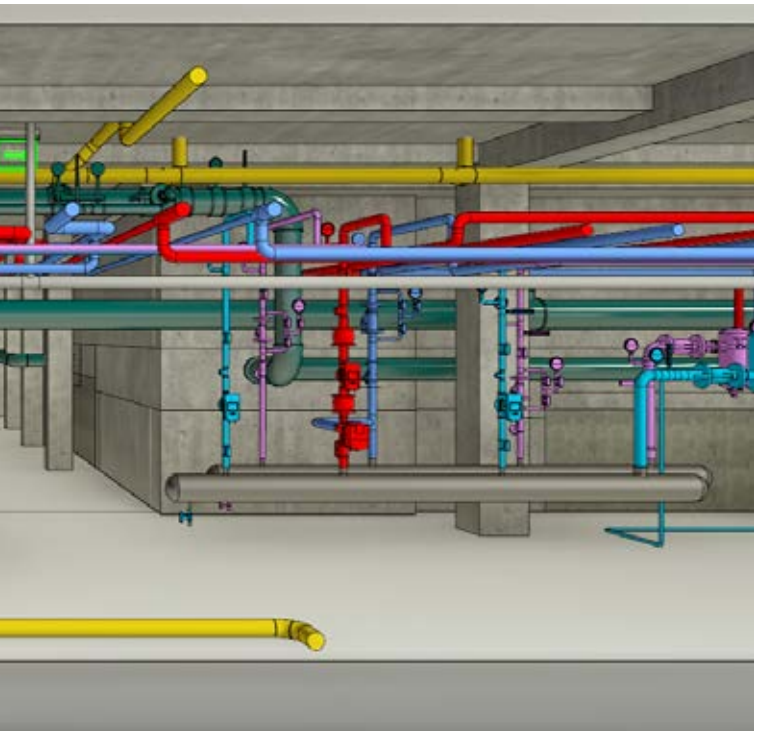
Services: **BIM Services | Architectural Design | MEP Design**
Function: **Sports facility**

**2.**



Scan for video

1. Visualization revealing technical details
2. View of the mechanical space under the pool



**BIM usage goals**

Based on client's requirements, the aim was to develop a multidisciplinary model of the building that would enable:

- Documentation of all design phases based on the information content of the model in accordance with the applicable national legislation
- The preparation of quantity take-offs

For future requirements, the model should be suitable for:

- Other simulations affecting the operation of the building (e.g. solar study, thermal inspection, construction time simulation)
- BIM-based construction coordination on site
- For an implementation model that can be further developed after the execution design phase

**Fit to Open BIM and Closed BIM**

The Central Model includes all individual models belonging to the industrial branches or disciplines.

We have defined the technical conditions of the workflow, the exact location of the central model, the way it is shared, the connection and communication framework between the disciplines and towards the client/developer.

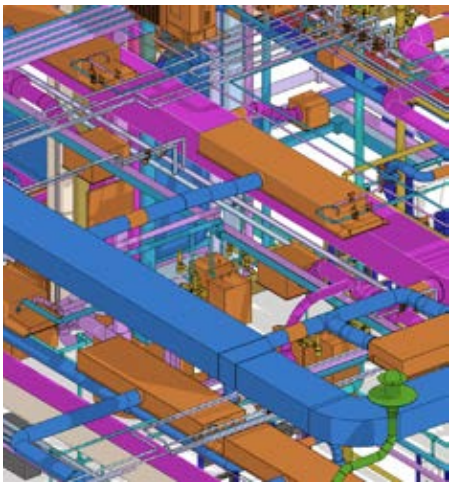
During the project, it was important for the designer to create a flexible digital ecosystem that is able to integrate additional project participants at any time, thus defining and developing a system that simultaneously enforces the principles of open BIM and closed BIM.

The default common language for the model-based communication - just as the form of internal data provision - consisted of the .rvt, .ifc and .dwg file formats.

# Office building, Sárospatak

*Master of Architecture Award – Industrial Building Award*

We were asked by one of CEE's leading steel prefabrication and general construction companies to design a new headquarters building by merging two existing facilities.



1.

Client: **Weinberg 93 Építő Ltd.** LOD: **300** Area: **5,000 m²**

Mechanical: **Comfort Heating-Cooling | Plumbing | Air Ventillation**

Electrical: **Low voltage Systems | Earthing&Lightning Protection | Lighting Design**

Fire protection: **Building Fire Protection | Fire Alarm Systems | Fire Hydrant | Heat&Smoke Detection**

**Purpose of the project**

We have been commissioned to design a new office building that can form an integral part of the existing modern office building, which functions as the headquarters of the production hall.

The new building was designed to be expandable and functionally integrate the company's management and production management processes.

All of this was envisioned with an aesthetic, modern look that adequately represents the client's market position and quality requirements.

The planned new office building is connected to the existing hall building and consists of two parts: a three-storey office building with a pillar frame and a connecting neck floor.

This creates a functional unity between the old and the new office building by connecting the offices of the main building with a bridge structure. The new building contains offices, meeting rooms and service facilities. The premises in the existing building provides, after a minimum of refurbishment, office space with almost the same function and meet the needs.

# Steel prefabrication company leads the way

3.

Services: **Scan to BIM | Architecture Design | Interior Design MEP Design | Project management**

Function: **Office building**

1. Detail of the LOD 300 MEP model
2. Ortogonal view of the entire MEP model
3. Visualization revealing technical details

**BIM usage goals**

Creation of a model of the central building affected by the design for all relevant disciplines.

Expectations of model usability:

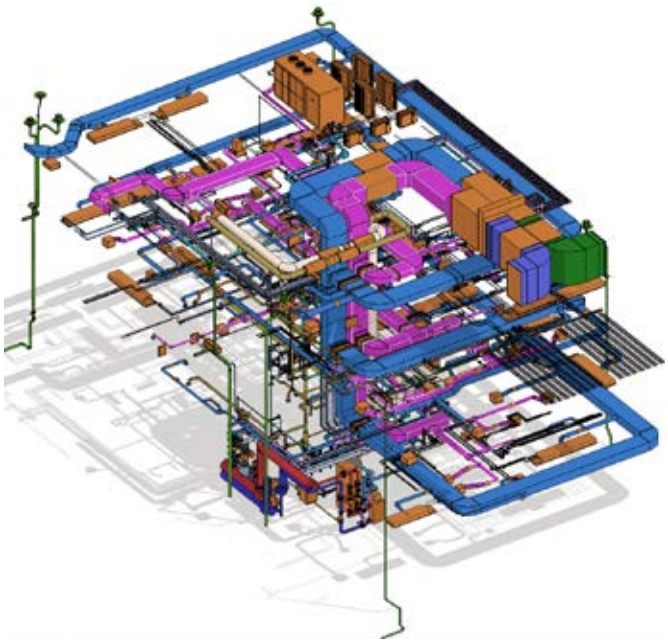
- Document all design phases based on the model's information content, as per the current Hungarian regulations
- Prepare quantity reports
- Detect clashes and create solutions for spatial coordination
- Prepare a solar exposure test.

For future requirements, the model should be suitable for:

- Other simulations affecting the operation of the building (e.g. solar study, thermal inspection, construction time simulation)
- BIM-based construction coordination on site
- For an implementation model that can be further developed after the execution design phase.

Following the design, the designers of the relevant disciplines (BIM participants) participated in a model-based cooperation in real time. All disciplines were part of the central model.

2.



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