BIM FOR DESIGN OF MEP-INSTALLATIONS

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INGENIUM GROUP

Experts in sustainable buildings

Experts in sustainable industry

Experts in electrical installations
INGENIUM

REVENUE
3,1 MIO €

HISTORY
1968 - 2018

> 90 FTE
- master
- bachelors
- other

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BIM

Daylight simulations
Energy simulations
Comfort simulations
Demolition
Maintenance
Facility management

Energy Performance
Heating
Cooling
Plumbing
Ventilation
Lighting
Electrical distribution

Building Information Modeling

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CONTENT

1. Examples of BIM advantages in MEP design process at Ingenium Group:
   - Creation of Bill Of Quantities (BOQ) of a BIM-project
   - Heating: from heat load to pipe size

BIM IN MEP DESIGN EXAMPLE 1: CREATION OF BOQ

New Hospital Wing: floor area 15.000 m²

Architectural + Structural Model

MEP models (INGENIUM):
- HVAC
- PLUMBING
- ELECTRICITY
- MEDICAL GASES
- PNEUMATIC TRANSPORT
BIM IN MEP DESIGN EXAMPLE 1: CREATION OF BOQ

MEP model (INGENIUM):
- HVAC (shown): circa 25,000 elements in total
- PLUMBING
- ELECTRICITY
- MEDICAL GASSES
- PNEUMATIC TRANSPORT

Zoomed in: one element (air swirl diffuser)

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BIM IN MEP DESIGN EXAMPLE 1: CREATION OF BOQ

Every element in MEP-model has a BOQ-code (standard code in company BIM-library)

Result: every relevant parameter (BOQ code, length, power, ...) is exported to an Excel and then automatically manipulated to create a complete BOQ within minutes
BIM IN MEP DESIGN EXAMPLE 2: DIMENSIONING AND CALCULATIONS

New School Building – floor area 7,000 m²

Heat Load Calculation → Radiator dimensioning → Pipe dimensioning

BIM IN MEP DESIGN EXAMPLE 2: DIMENSIONING AND CALCULATIONS

EXCEL CALCULATIONS → SKETCH ON PAPER → COMPUTER AIDED DESIGN

Lakbors, Antwerp
BIM IN MEP DESIGN EXAMPLE 2: DIMENSIONING AND CALCULATIONS

Automatic loading of BIM-information:
- Geometry (walls, floors, windows, …)
- Design Temperatures
- Insulation values
- …

Automatic Heat Load calculation (EN 12831) + export to Revit

Manual creation of HVAC Zones in BIM model

Heat Load Calculation ➔ Radiator dimensioning ➔ Pipe dimensioning

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BIM IN MEP DESIGN EXAMPLE 2: DIMENSIONING AND CALCULATIONS

Parameters radiators:
- Type
- Max. height
- Temperatures
- …

Automatic selection of radiators

(Semi-)automatic placing of radiators in BIM with data (heat rate + mass flow)

Heat Load Calculation ➔ Radiator dimensioning ➔ Pipe dimensioning

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BIM IN MEP DESIGN EXAMPLE 2: DIMENSIONING AND CALCULATIONS

Input materials piping, max pipe losses, ...

Automatic pipe network calculation & adjusting of pipes in BIM

Heat Load Calculation  Radiator dimensioning  Pipe dimensioning

BIM IN MEP DESIGN & ENERGY/COMFORT SIMULATIONS - CONCLUSIONS

With BIM methods some (MEP) design processes can be very effectively automated, resulting in not only work load reduction, but also in reduction of mistakes.
THANK YOU

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