Innovations and Maturity Levels in openBIM Project Management

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President of Bexel Consulting

Steering Committee member of buildingSMART International Construction room

Vice-Chair of FIDIC EFCA BIM and Digitalization Committee

BEXEL CitA BEXEL MANAGER

BEXEL

buildingSMART Multinational Member

NUMBERS

16 YEARS in development of bim software

11 YEARS of Construction Project Management Experience

250 PROJECTS of diverse type and size

9 MILLION square meters of construction projects delivered

55 COUNTRIES

5 CONTINENTS

AWARDS

buildingSMART International

2020 I WINNER OF INNOVATION AWARD for implemented technology

2019 I Top 2 BIM Implementation in category of operations and maintenance

2018 I Top 6 BIM Implementation in category of construction

PRODUCTS

BEXEL **MANAGER**

INTEGRATED 3D | 4D | 5D | 6D

INTELLIGENT BIM SOLUTION

CLICK PICTURE FOR VIDEO LINK

SERVICES

INTEGRATED BIM PROJECT MANAGEMENT

BIM EDUCATION AND IMPLEMENTATION

buildingSMART Professional Certification

info@bexelmanager.com

Winner of the buildingSMART International INNOVATION AWARD 2020!

BEXEL **MANAGER**

BEXEL

buildingSMART International

ABOUT US

BEXEL powered by BEXELMANAGER

GLOBAL PRESENCE IN 55 COUNTRIES WORLDWIDE

BEXEL MANAGER

IS LOCALIZED IN **10 LANGUAGES**

ENG DEU ESP ITA FRA RUS KOR HUN SRP SLV

BEXEL MANAGER IS CURRENTLY USED FOR MANAGING PROJECTS WITH TOTAL VALUE EXCEEDING 90 BILLION USD

OUR CLIENTS

80% ARE LARGE INVESTORS, PROJECT MANAGERS AND CONTRACTORS

Ballast Nedam
OBERMEYER
SIEMENS
HOCHTIEF
ferrovial
COWI
FCC
ACR Grupo
ITALFERR GRUPPO FERROVIE DELLO STATO ITALIANE
ATI PROJECT
OHL
BESIX
WOLFF & MÜLLER
SALFO AND ASSOCIATES SA Engineering & Management Consultants
EUROVIA VINCI
KESZ GROUP
DORR
CENGIZ HOLDING
ERBUD
iC consulenten
energetika ljubljana
DRI
DARS
STANOVANJSKI SKLAD REPUBLIKE SLOVENIJE JAVNI SKLAD
2TDK
POMGRAD
HI HERING
AC
EURO-ASFALT
IRGO CONSULTING d.o.o.
DELTA REAL ESTATE
Exing b&p
Vi Holding
BETON
AECOM
COMPLANT 中国成套设备进出口集团有限公司
ABIPRAYA
itm Corporation
SK ecoplant
Rustomjee
CLAYCO
KAZZINC
TAKENAKA
AL DIWAN AL AMIRI
Primekss
LARSEN & TOUBRO
KARISMA HOTELS & RESORTS
中国建筑 CHINA STATE CONSTRUCTION
Drake & Scull
Nesma & Partners نسما وشركاهم

REFERENCES

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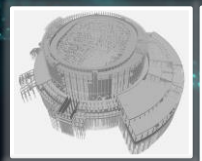
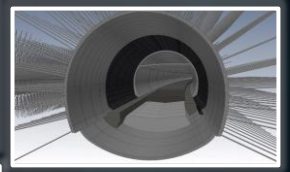
COLOSSAL SPORT VENUES



HOTELS AND RESORTS

RESIDENTAL COMPLEXES

INDUSTRIAL FACILITIES



INFRASTRUCTURE

SHOPPING MALLS

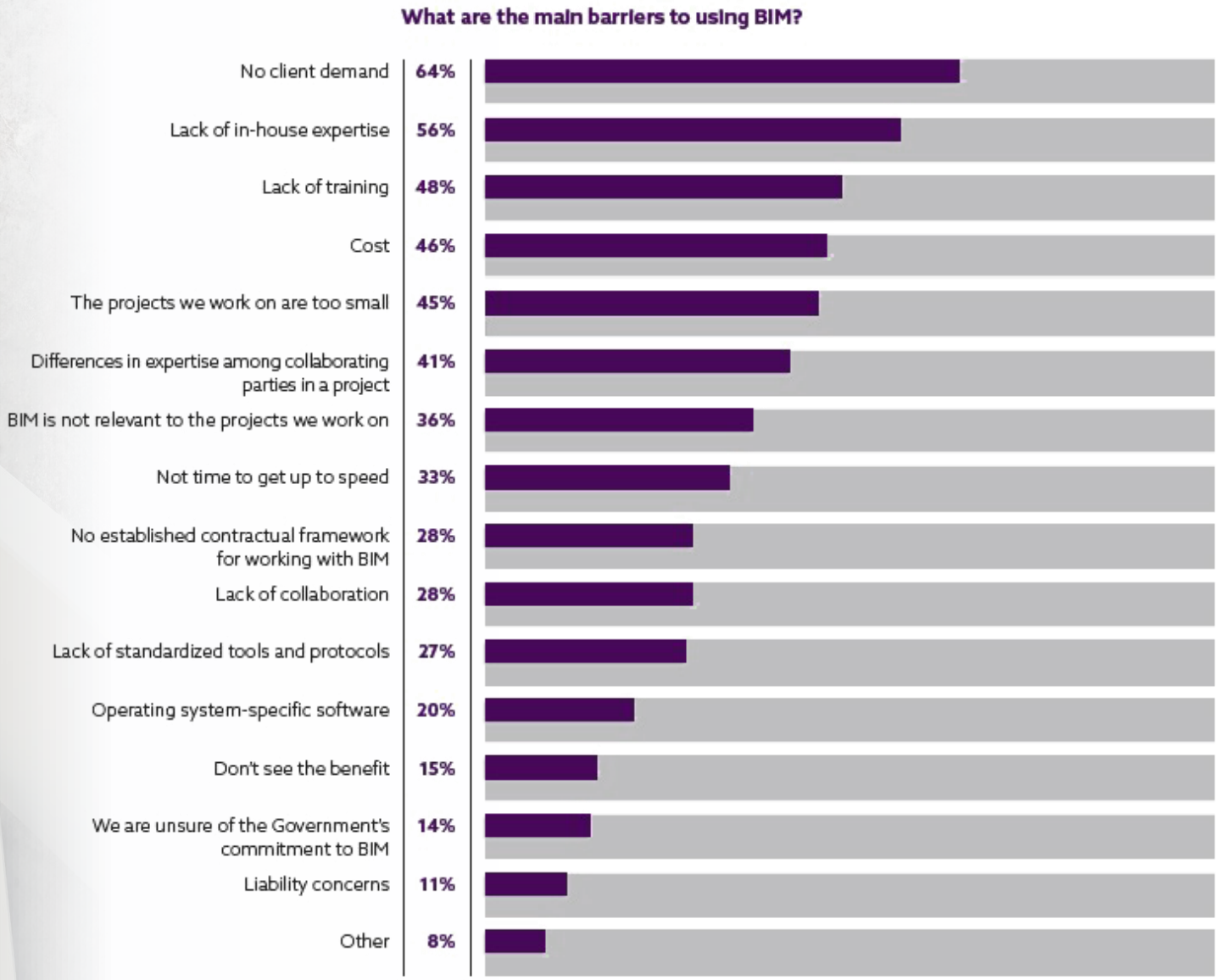
HOSPITALS

OFFICE BUILDINGS

BIM FOR THE SAKE OF BIM

LACK OF CLIENT DEMAND, CITED BY 64% OF THIS YEAR'S RESPONDENTS, REMAINS THE GREATEST BARRIER AMONG THOSE YET TO ADOPT BIM.

ALIGNED TO THIS, 45% SAY THAT THE PROJECTS THEY WORK ON ARE TOO SMALL (THIS FIGURE HAS ACTUALLY INCREASED SINCE LAST YEAR), OR THAT BIM IS NOT RELEVANT TO THEIR PROJECTS (36%).



Source: NBS National BIM Report 2020

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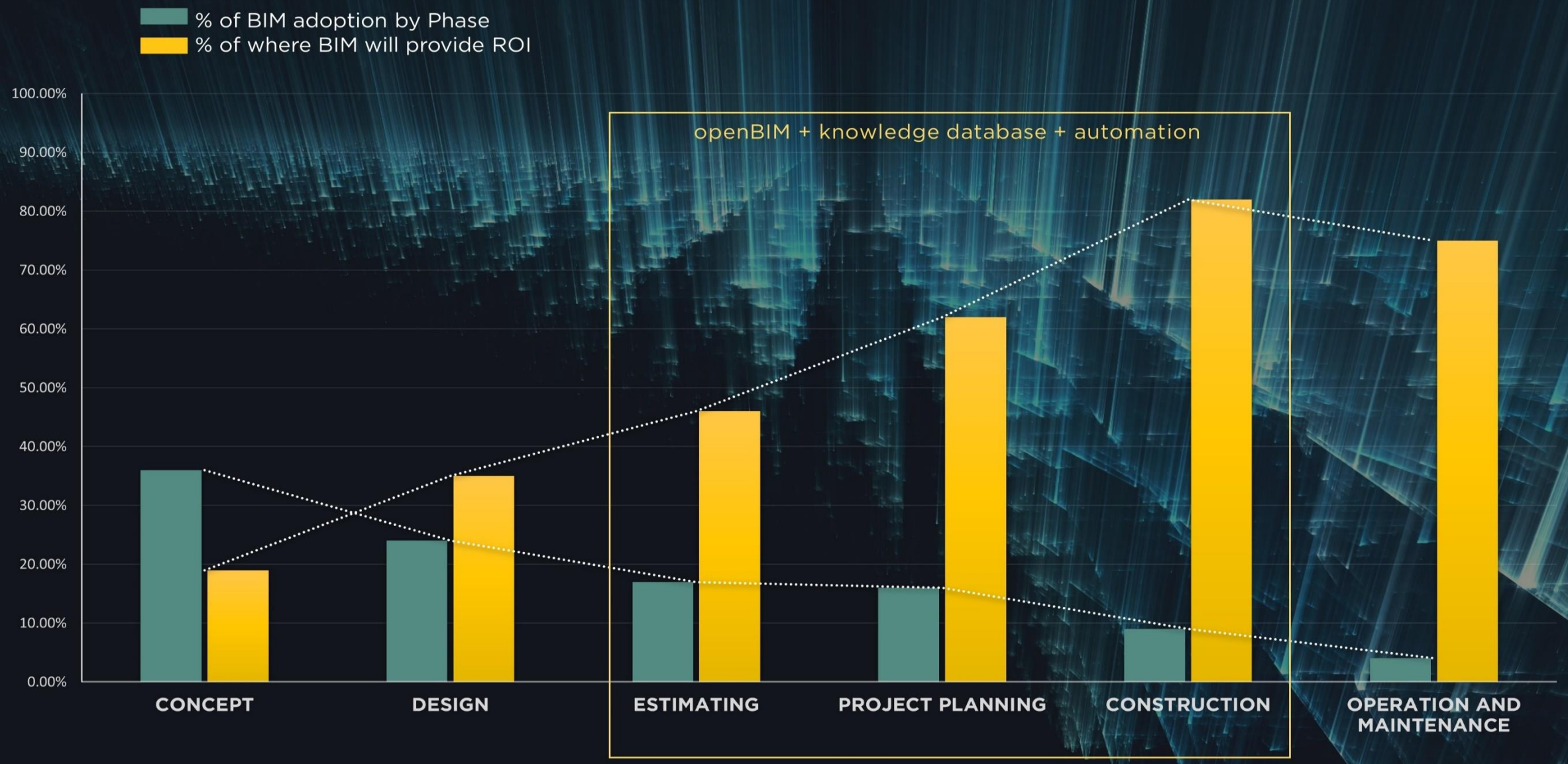
ACCEPTANCE OF BIM IN CONSTRUCTION INDUSTRY



Source: (01) McGraw-Hill Smart Market Report; The Business Value of BIM for Construction in Major Global Markets, (02) Internal BEXEL Market research

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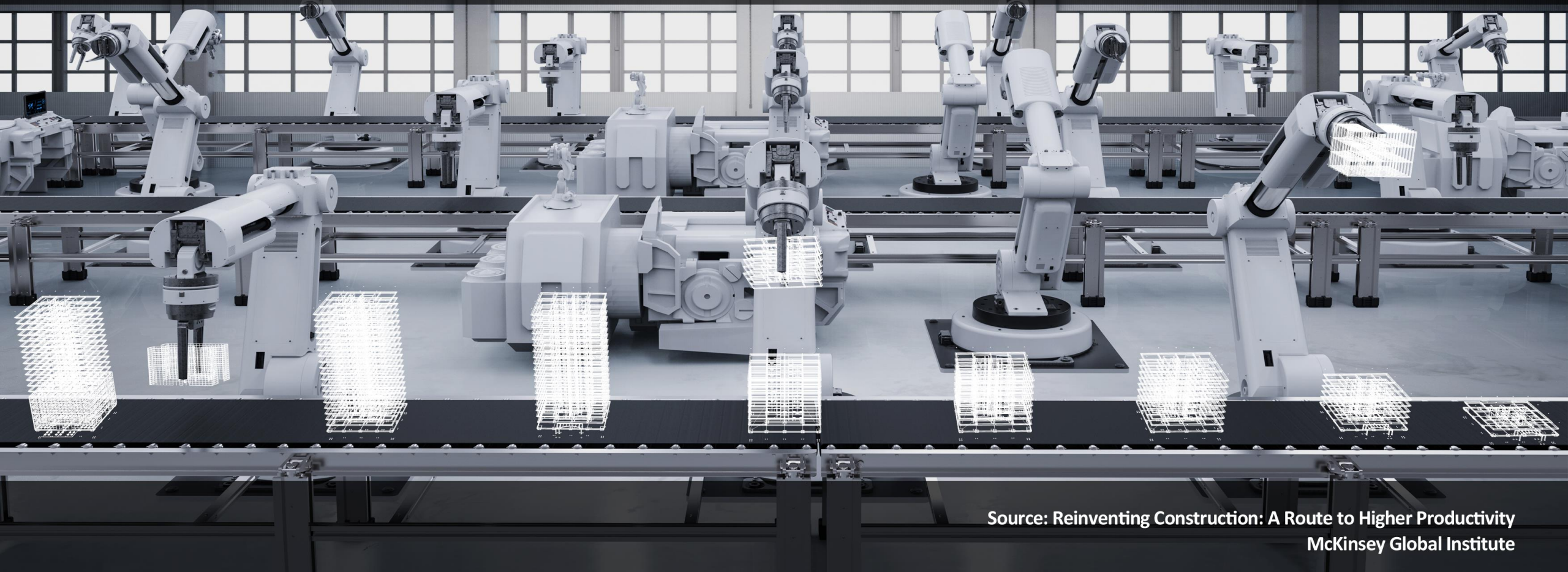
5-10x productivity boost

possible for some parts of construction industry by moving to a manufacturing-style production system



Source: Reinventing Construction: A Route to Higher Productivity
McKinsey Global Institute

DIGITAL TRANSFORMATION PACKAGES

*According to ISO 19650

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BRONZE	SILVER	GOLD	PLATINUM
10 days	20 days	30 days	90 days

• CLIENT-CUSTOMIZED CONFIGURATION DOCUMENTS & TEMPLATES •

Information Delivery Specification • Smart Selection Sets • Clash Detection Matrix
• BIM Ready WBS and Cost Database
• Construction Methodology • Monthly Payment Certificate
• As-built Documentation Checklist

• ADVANCED REPORTING DASHBOARDS•

BIM Model Health Report Dashboard • Area Analysis Dashboard
• 4D/5D Plan Dashboard (Budget, Cashflow, Resource needs)
• 4D/5D Project Monitoring Dashboard (Planned vs Actual, EVA, CPI, SPI)
• Client-Customized Project Overview Dashboard

• Company BIM Maturity Assessment • Proof of Concept
• Pilot Project Support • On-premise Support •

BEXEL SINGLE SOURCE OF TRUTH TECHNOLOGY

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AUTODESK REVIT · GRAPHISOFT ARCHICAD · Bentley Advancing Infrastructure · Tekla Online · ALLPLAN A NEMETSCHEK COMPANY · VECTORWORKS A NEMETSCHEK COMPANY

IMPORT/UPDATE

IFC MULTIPLE IFC FILES

BCF COLLABORATION

KNOWLEDGE BASED MANAGEMENT

- IDM/IDS
- RULES OF MEASUREMENT
- CLASSIFICATIONS
- COST DATA BASES

BEXEL MANAGER

FEDERATED BIM MODEL

- BIM INTEGRATION DATA LAYER
- DATA MANAGEMENT

TEMPLATES

- SELECTION SETS
- METHODOLOGIES
- ZONES

ENGINES

- CLASH DETECTION
- QTO
- COST
- SMART 4D/5D SCHEDULE
- PROGRESS

- DOCUMENTS
- REPORTING SYSTEM
- API

SQL DATABASE

ONLINE VIEWER

Power BI

BEXELCDE ENTERPRISE

- COMMON DATA ENVIRONMENT
- FACILITY MANAGEMENT
- DOCUMENT MANAGEMENT SYSTEM
- COMMAND-LINE AUTOMATION SYSTEM

EXPORT

IFC

BCF

BIM COLLABORATION PLATFORMS

IMPORT/EXPORT

Excel · Project · ORACLE PRIMAVERA

ADD-IN APPLICATION

Microsoft Dynamics 365 · SAP ERP

CUSTOM INTEGRATION WITH 3RD PARTY SOLUTIONS

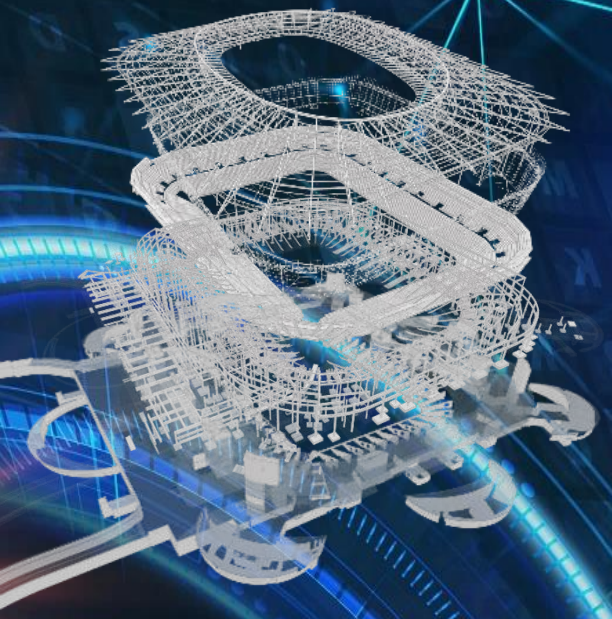
TASK AUTOMATION

CUSTOM REPORTS/EXPORTS

powered by BEXELMANAGER

INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH



GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

EXAMPLES

- AUTOMATED IDS DATA VERIFICATION ENGINE
- SMART CLASSIFICATION BASED ON MODEL ATTRIBUTES
- TIME AND COST BASED CLASH MANAGEMENT
- SYNCHRONIZATION OF TIME, COSTS AND RESOURCE DATA WITH BIM AUTHORING TOOLS

BIM QUERY LANGUAGE

DATA QUALITY CONTROL AND DATA MANAGEMENT

AUTOMATED DATA ENRICHMENT

EXAMPLES

- ADVANCED DATA HANDLING USING CLOUD BASED SERVICES AND EXTERNAL SYSTEMS
- TAILORED DATA EXPORTS FOR ADVANCED MS POWER BI DASHBOARDS
- DATA EXPORTS TO REGION SPECIFIC FORMATS (GAEB, BC3, …)
- DATA INTEGRATION WITH ERP SYSTEMS (SAP, MS DYNAMICS, …)

BIM DATA REPORTS&EXPORTS

API

IMPLEMENTATION OF IDM (INFORMATION DELIVERY MANUAL)

IDS (INFORMATION DELIVERY SPECIFICATION) BASED BIM DATA VERIFICATION

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- AUTOMATED IDS DATA VERIFICATION ENGINE
- CONDITIONALLY ENHANCED IDS DATA VERIFICATION ENGINE
- SMART COST CLASSIFICATION DATA ENRICHMENT (UNIFORMAT, MASTERFORMAT, UNICLASS)
- ATTACH MAXIMUM NUMBER OF PEOPLE TO SPACE ACCORDING TO SPECIFIC STANDARD

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- AUTOMATED IDS DATA VERIFICATION ENGINE PER CONSTRUCTION MONTH/WEEK
- AUTOMATED IDS VERIFICATION ONLY FOR THE ELEMENTS WHICH COST MORE THAN 100€
- CHECK IF THERE ARE ELEMENTS WHICH ARE NOT SCHEDULED/PRICED
- CREATE LOOK-AHEAD SELECTION SETS PER EACH ACTIVITY FOR NEXT DAY, WEEK, MONTH
- ATTACH EXACT COST AND SCHEDULE INFORMATION TO ELEMENTS (IFCProperties, IFC CostItems, IFCTask)
- ATTACH ALL COST ITEMS AND RESOURCE INFORMATION TO ELEMENTS
- ATTACH TASK(S) INFO TO ELEMENTS

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- AUTOMATED VERIFICATIONS IF ZONE/SPACE ELEMENT PROPERTIES ARE CORRECTLY DEFINED
- CREATE SELECTION SETS GROUPING CLASHES PER ZONE
- IMPORT CUSTOMIZED CLASH MATRIX AND PERFORM CLASH DETECTION
- ADD PROPERTY TO EACH ELEMENT DEFINING ITS ZONE AND SPACE
- ADD ALL RESPECTIVE SPATIAL IFCRelations (EG. Contained In Room)
- EXPORT THE ENRICHED DATA TO IFC, BCF OR EXCEL
- ATTACH EXACT CONSTRUCTION DATE TO EACH CLASH BCF

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- CREATE SELECTION SETS FOR EACH SUBCONTRACTOR
- CREATE SELECTION SETS FOR EACH RESOURCE (MATERIAL, EQUIPMENT, LABOUR)
- CREATE SELECTION SETS WITH LOOK-AHEAD PLANS PER SUBS, MONTHS, COST CLASSIFICATIONS
- ADD SUBCONTRACTOR(S) PROPERTY TO EACH ELEMENT
- ATTACH RESOURCE PROPERTIES (NAME, QTY, COST) TO EACH ELEMENT
- CALCULATE TASK DURATIONS BASED ON ACTIVITES, QUANTITES AND RESOURCE LIMITATIONS
- EXPORT THE ENRICHED DATA TO IFC, BCF, EXCEL, POWER BI

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- AUTOMATED PROGRESS ENTRIES BASED ON ACTUAL ACTIVITY SELECTION SETS
- AUTOMATED PROGRESS ENTRIES BASED ON SUB/COST CLASSIFICATION SELECTION SETS
- CALCULATE EVA, CPI, SPI AND OTHER KPIS FOR EACH ELEMENT / GROUP OF ELEMENTS/TASKS
- CREATE SELECTION SETS WITH ELEMENTS PERFORMED ON TIME, BEHIND OR AHEAD OF SCHEDULE
- ATTACH EVA, CPI, SPI TO EACH ELEMENT
- EXPORT THE ENRICHED DATA TO IFC, BCF, EXCEL, POWER BI

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INTEGRATED BIM DATA ECO-SYSTEM

BEXEL MANAGER SINGLE SOURCE OF TRUTH

GEOMETRY	SELECTION SETS	RESOURCES
ATTRIBUTES	MATERIALS	COST ITEMS
RELATIONS	ELEMENTS	SCHEDULE TASKS
QTO	ZONES	PROGRESS
DOCUMENTS	CONFLICTS	SUBCONTRACTORS
SCHEDULE	BUDGET	FM

INTERCONNECTED BIM DATA DOMAINS

- IMPORT DATA FROM 3RD PARTY APPS AND CLOUD BASED SOLUTIONS
- AUTOMATED DATA ENRICHMENT OF KNOWLEDGE BASES FOR FUTURE PROJECTS
- ADVANCED DATA HANDLING USING CLOUD BASED SERVICES AND EXTERNAL 3RD PARTY APPS
- TAILORED DATA EXPORTS FOR ADVANCED MS POWER BI DASHBOARDS
- DATA EXPORTS TO REGION SPECIFIC FORMATS (GAEB, BC3, …)
- DATA INTEGRATION WITH ERP SYSTEMS (SAP, MS DYNAMICS, …)

NEXT GENERATION OF DIGITAL CONSTRUCTION MANAGEMENT

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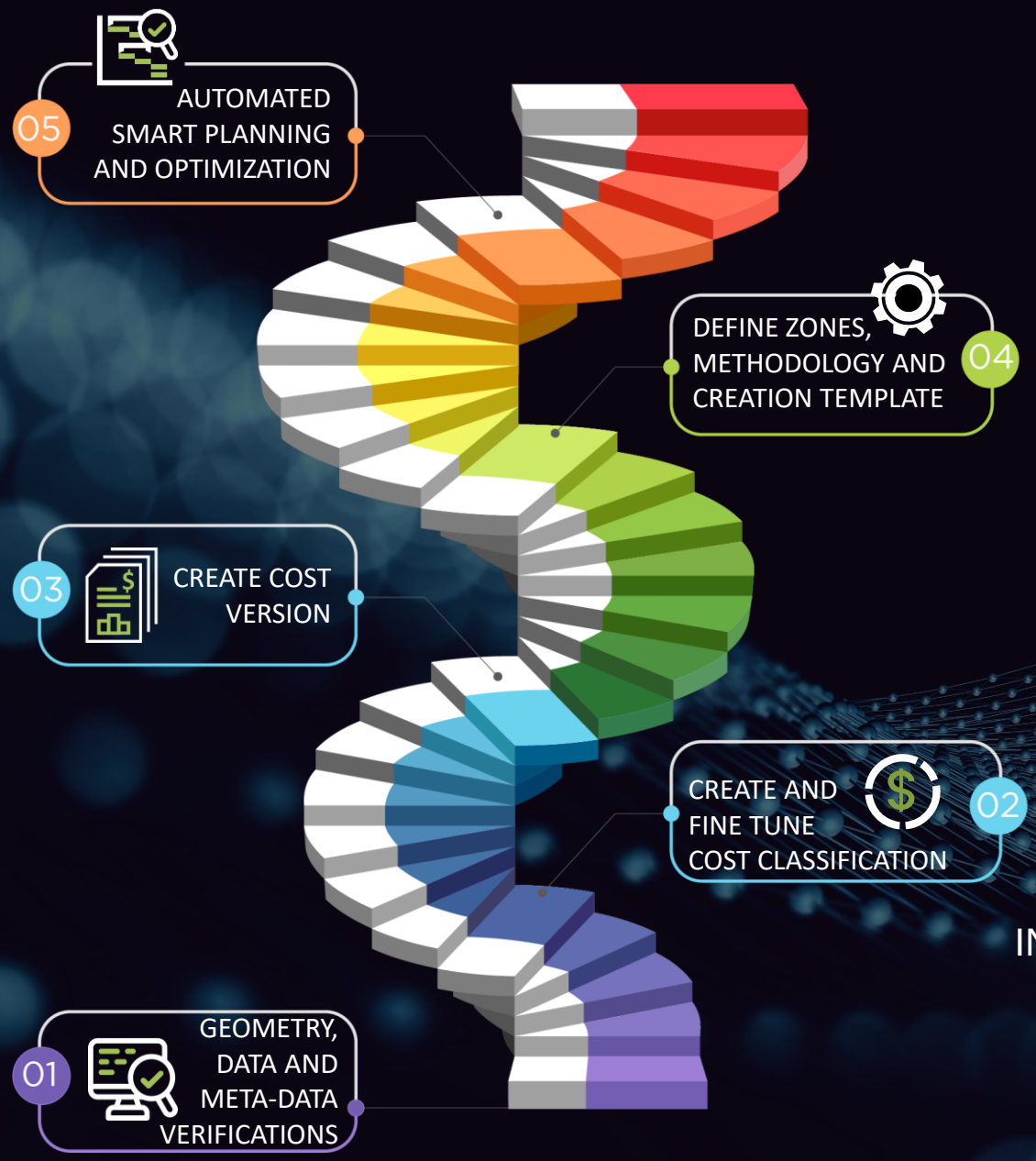

INTELLIGENT 4D/5D PLANNING WORKFLOW

AUTOMATED CONNECTION BETWEEN IFC AND QTO, COST AND METHODOLOGIES

OPTIMIZED AND DETAILED CONSTRUCTION SCHEDULE LINKED TO BIM ELEMENTS WITH ALL RELATIONS BETWEEN TASKS

OPTIMISED SCHEDULE FLOWLINE (FOLLOWING LOCATION BASED PLANNING)

ACCURATE ESTIMATIONS OF RESOURCE NEEDS (DAILY, WEEKLY, MONTHLY)

openBIM INTEGRATION

Classifications
ISO 12006-2 and ISO 12006-3

IFC

BCF

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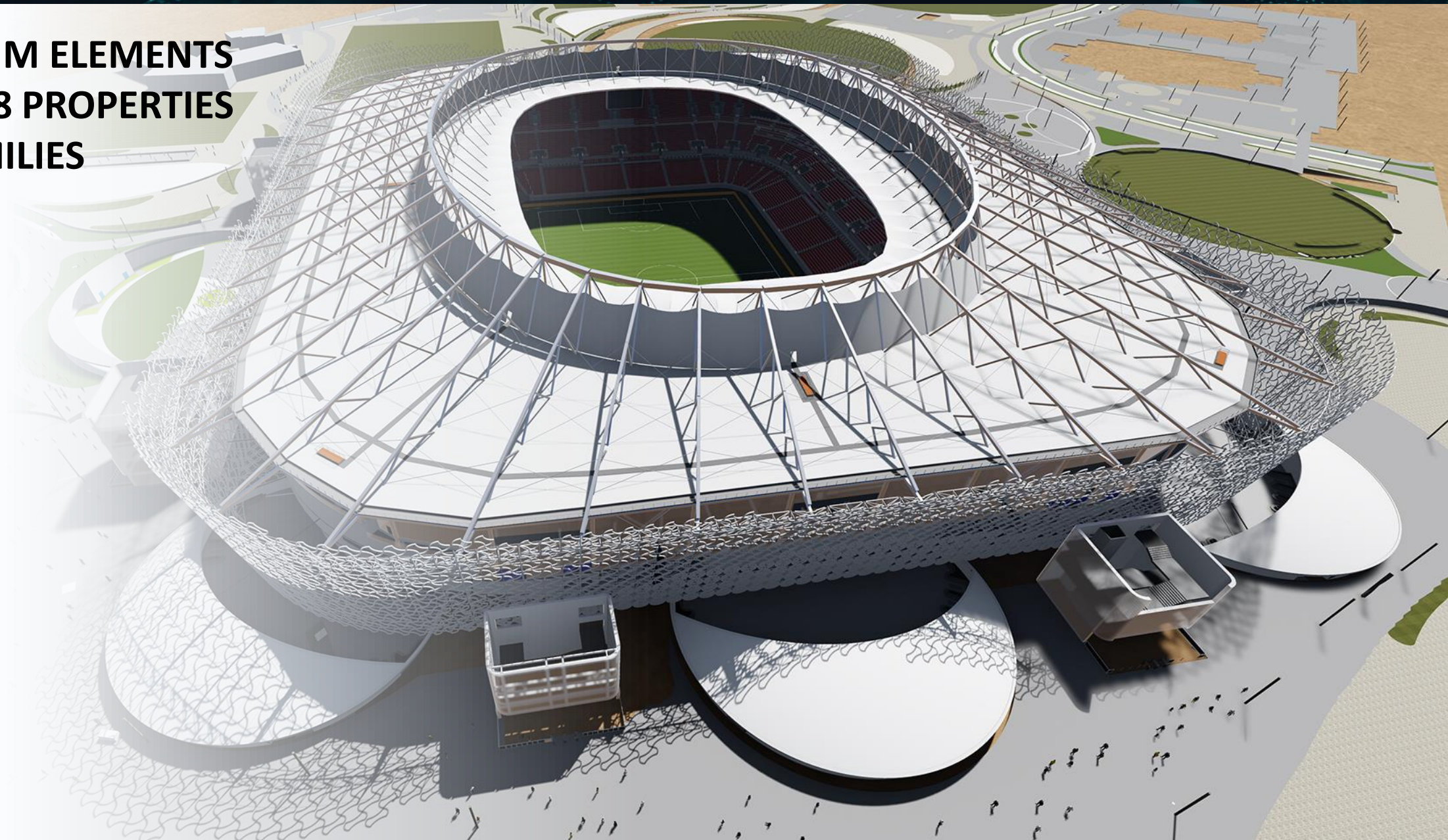
621,074 BIM ELEMENTS
28,051,408 PROPERTIES
8,643 FAMILIES



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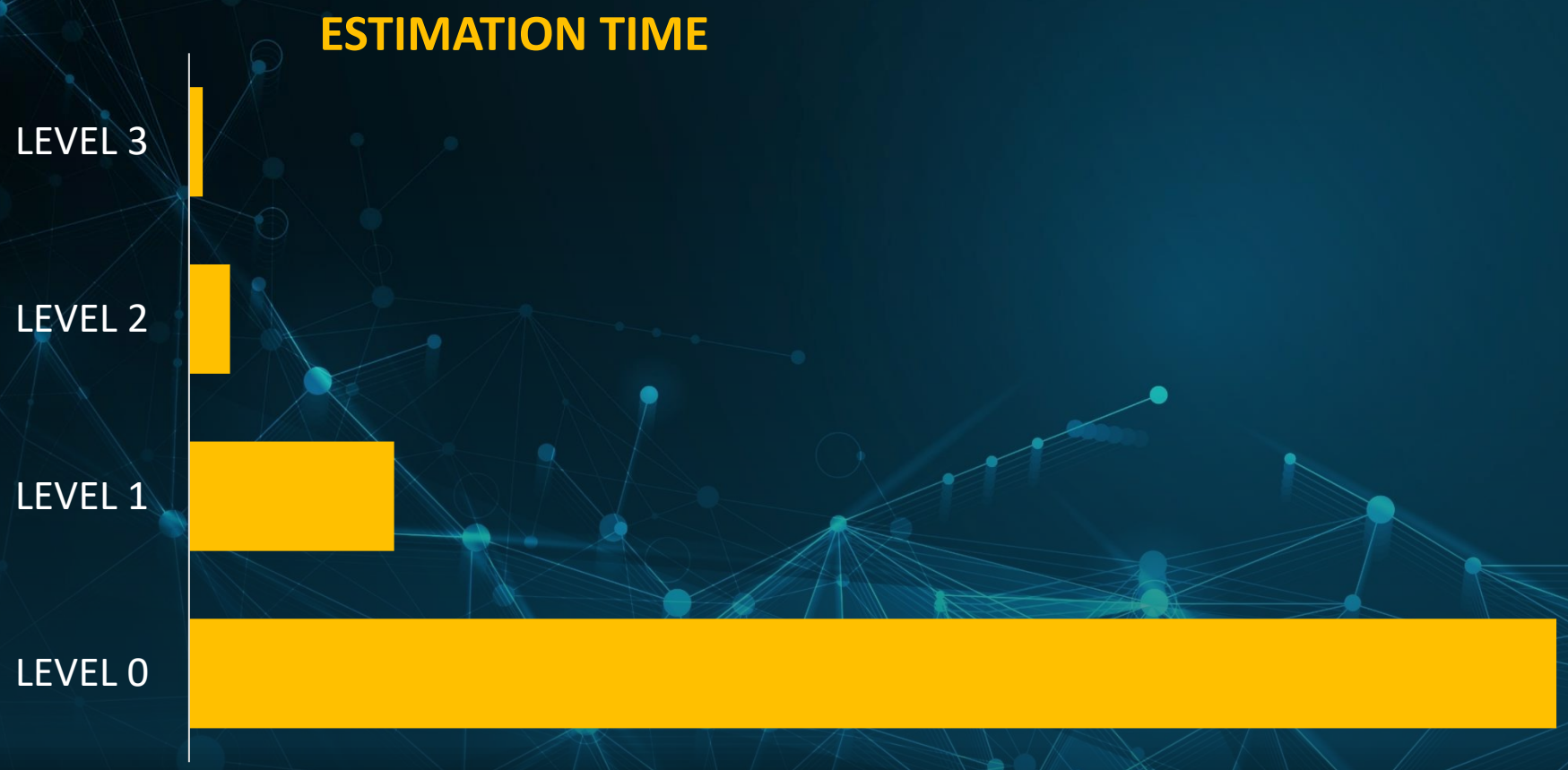
5D BIM COST ESTIMATION

WORKFLOW MATURITY LEVELS



20-100X FASTER BIM COST ESTIMATION WITH LEVEL 2 AND LEVEL 3 WORKFLOWS

5D BIM COST ESTIMATION - LEVEL 0

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CHALLENGES:

MANUAL COST CALCULATIONS

BIM USED ONLY AS A SUPLEMENTARY SOURCE FOR MANUAL ESTIMATION ANALYSES

LABOR INTENSIVE UPDATE PROCESS

.....

5D BIM COST ESTIMATION - LEVEL 1

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BENEFITS:

5-10X FASTER THAN BIM COST LEVEL 0

AUTOMATED UPDATES

BIM MODEL-BASED BUDGETING AND ESTIMATION

COST CLASSIFICATION → BIM ELEMENT QUERIES → COST ITEM CODE ATTRIBUTE → QUANTITY FORMULAS → RESOURCE DATA → AUTO ASSIGN COST VERSION = BUDGET

B1010.10

UNIFORMAT
MASTERFORMAT
DIN276

[Code]='%B1010.10%'

CHALLENGES:

COST RELATED ATTRIBUTES HAVE TO BE MANUALLY DEFINED TO ALL ELEMENTS IN THE BIM MODEL

CHALLENGING MATCHING OF TRADITIONAL COST ITEMS AND BIM ELEMENTS (FAMILIES)

COST ITEMS ARE MANUALLY ENRICHED WITH BIM QUERIES AND FORMULAS

5D BIM COST ESTIMATION - LEVEL 2

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IFC BIM MODEL

IfcEntity
IfcObjectType
IfcMaterial
IfcProduct
Dimensions or other key properties (optional)

AUTOMATED DATA ENRICHMENT ADD-IN

CLASSIFICATION CODE GENERATED BASED ON IFC DATA

GENERATED WBS WITH QUANTITIES

BASED ON CLASSIFICATION CODES AND IFC PROPERTIES (IfcEntity, IfcObjectType)

AUTOMATED GENERATION OF COST ITEMS

B1010.10

ACCORDING TO DEFINED COST CLASSIFICATION CONTAINING BIM QUERIES, DESCRIPTIONS

FINE-TUNING

FORMULAS
UNITS
PRICES
RESOURCES (OPTIONAL)

AUTO ASSIGN COST VERSION = BUDGET

ADDING VARIABLE COSTS

MARKUPS
OVERHEAD
TAXES

*ACCORDING TO ISO 12006

BENEFITS:

5X FASTER THAN 5D BIM COST LEVEL 1

FULL USAGE OF IFC CLASSIFICATION AND ATTRIBUTES

BIM COST DATABASES CONTINUOUSLY EVOLVE

FULL REUSAGE OF PREVIOUSLY CREATED COST ITEMS

CHALLENGES:

MANUAL CREATION OF MULTIPLE ACTIVITIES FOR THE SAME GROUP OF ELEMENTS

MANUAL ADJUSTMENT CODES

5D BIM COST ESTIMATION - LEVEL 3

BEXEL powered by BEXELMANAGER

IFC BIM MODEL

IfcEntity
IfcObjectType
IfcMaterial
IfcProduct
Dimensions or other key properties (optional)

BENEFITS:

3X FASTER THAN 5D BIM COST LEVEL 2

FULL USAGE OF IFC CLASSIFICATION AND ATTRIBUTES

UTILIZE CONSTRUCTION METHODOLOGIES AND EVOLVING KNOWLEDGE DATABASE FOR GENERATION OF MORE DETAILED COST CLASSIFICATION STRUCTURE

AUTOMATED DATA ENRICHMENT ADD-IN

CLASSIFICATION CODE GENERATED BASED ON IFC DATA

GENERATED WBS WITH QUANTITIES

BASED ON CLASSIFICATION CODES AND IFC PROPERTIES (IfcEntity, IfcObjectType)

*ACCORDING TO ISO 12006

AUTOMATED GENERATION OF COST ITEMS

B1010.10

ACCORDING TO DEFINED COST CLASSIFICATION AND CONSTRUCTION METHODOLOGIES CONTAINING BIM QUERIES, DESCRIPTIONS

LOAD KNOWLEDGE DATABASE

FORMULAS
UNITS
PRICES
RESOURCES (OPTIONAL)

AUTO ASSIGN COST VERSION = BUDGET

ADDING VARIABLE COSTS

MARKUPS
OVERHEAD
TAXES

LEVEL 3

CONSTRUCTION METHODOLOGIES

ONE FAMILY (IfcObjectType) → MULTIPLE COST ITEMS (ACTIVITIES)

KNOWLEDGE DATABASE

FOR AUTOMATED MAPPING OF FORMULAS, UNITS, PRICES AND RESOURCES

5D BIM COST ESTIMATION - LEVEL 2&3

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Rooms | Battery Room Equipment | Furniture by Rooms | QTO-Based WBS | UNIFORMAT based QTO (3 Levels) | UNIFORMAT based QTO (4 levels)

Structure - Custom set of elements (121391 Elements)	Count	Area (Sum)	Volume (Sum)	Length (Sum)
Assembly Code = A	574		146,520.444 ft³	9,268.52 ft
Assembly Code = A10	574		146,520.444 ft³	9,268.52 ft
Assembly Code = A1010	458		73,065.883 ft³	8,233.44 ft
Assembly Code = A1010100	214	18,063.547 ft²	45,612.965 ft³	2,749.22 ft
Footing_CH_I - F2	88	5,632.002 ft²	11,264.000 ft³	704.00 ft
MS-Light and Camera Pole Foundat...	51	160.215 ft²	1,281.753 ft³	0.00 ft
NEW UMS pit - NEW UMS pit	1	167.577 ft²	1,317.795 ft³	16.67 ft
PASE-FDNS-PILE CAP-R17 - 2'6 Di...	3	66.201 ft²	78.692 ft³	0.00 ft
PASE-FDNS-PILE CAP-R17 - 3'-6" ...	39	1,519.969 ft²	10,135.068 ft³	0.00 ft
PASE-FDNS-PILE CAP-R17 - 3'-6" ...	2	38.486 ft²	577.474 ft³	0.00 ft
WF1	24	6,064.622 ft²	12,129.238 ft³	1,221.76 ft
WF2	3	3,989.613 ft²	7,979.222 ft³	725.38 ft
WF3	2	142.223 ft²	284.445 ft³	21.33 ft
WF4	1	282.639 ft²	565.278 ft³	60.08 ft
Assembly Code = A1010200	37	13,719.405 ft²	13,848.580 ft³	1,987.05 ft
Assembly Code = A1010220	207		13,604.338 ft³	3,497.17 ft
Assembly Code = A1030	116	20,232.144 ft²	73,454.561 ft³	1,035.08 ft
Assembly Code = A1030100	116	20,232.144 ft²	73,454.561 ft³	1,035.08 ft
Assembly Code = B	15246			

COST CLASSIFICATION GENERATED FROM QTO

ELEMENT QUERIES ARE AUTOMATICALLY GENERATED FROM QTO

Excel

Outline Level	Code	Name	Description	Fixed Unit Cost	Unit Cost	Daily Output	Quantity Type	Quantity Unit	Quantity Formula	Element Query	Material Supplement	Labor Supplement
1		Uniformat Cost (										
1.1	A	Substructure								match(['Assembly Code'], '^(.{0}A.*)')		
1.1.1	A10	Foundations								match(['Assembly Code'], '^(.{0}A10.*)')		
1.1.1.1	A1010	Standard Found								match(['Assembly Code'], '^(.{0}A1010.*)')		
1.1.1.1.1	A1010100	Footings & Pile (								match(['Assembly Code'], '^(.{0}A1010100.*)')		
1.1.1.1.1.0	A1010100 0001	WF3	WF3		$82,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'WF3'	$27,33	$27,33
1.1.1.1.1.0	A1010100 0002	WF2	WF2		$82,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'WF2'	$27,33	$27,33
1.1.1.1.1.0	A1010100 0003	WF1	WF1		$82,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'WF1'	$27,33	$27,33
1.1.1.1.1.0	A1010100 0004	Sump Pit_FB_Ch	Sump Pit_FB_CH_I - Sump Pit_FB_C		$79,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Sump P	$26,33	$26,33
1.1.1.1.1.0	A1010100 0005	PASE-FDNS-PILE	PASE-FDNS-PILE CAP-R17 - 3'-6" Dia		$75,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'PASE-F(	$25,00	$25,00
1.1.1.1.1.0	A1010100 0006	PASE-FDNS-PILE	PASE-FDNS-PILE CAP-R17 - 3'-6" Dia		$75,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'PASE-F(	$25,00	$25,00
1.1.1.1.1.0	A1010100 0007	PASE-FDNS-PILE	PASE-FDNS-PILE CAP-R17 - 2'6 Dia.x		$75,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'PASE-F(	$25,00	$25,00
1.1.1.1.1.0	A1010100 0008	WF4	WF4		$82,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'WF4'	$27,33	$27,33
1.1.1.1.1.0	A1010100 0009	NEW UMS pit - N	NEW UMS pit - NEW UMS pit		$75,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'NEW Uh	$25,00	$25,00
1.1.1.1.1.0	A1010100 0010	MS-Light and Ca	MS-Light and Camera Pole Foundat		$75,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'MS-Ligh	$25,00	$25,00
1.1.1.1.1.0	A1010100 0011	Footing_CH_I - F	Footing_CH_I - F2		$79,00	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Footing	$26,33	$26,33
1.1.1.1.2	A1010200	Foundation Wal								match(['Assembly Code'], '^(.{0}A1010200.*)')		
1.1.1.1.2.0	A1010200 0001	Basic - Foundati	Basic - Foundation - 12" Concrete		$69,40	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Basic - F	$23,13	$23,13
1.1.1.1.2.0	A1010200 0002	Basic - Concrete	Basic - Concrete - 8" - Foundation		$69,40	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Basic - C	$23,13	$23,13
1.1.1.1.2.0	A1010200 0003	Basic - Concrete	Basic - Concrete - 16" - Foundation		$69,40	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Basic - C	$23,13	$23,13
1.1.1.1.2.0	A1010200 0004	Basic - Concrete	Basic - Concrete - 12" - Foundation		$69,40	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Basic - C	$23,13	$23,13
1.1.1.1.3	A1010220	Foundation Wal								match(['Assembly Code'], '^(.{0}A1010220.*)')		
1.1.1.1.3.0	A1010220 0001	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00
1.1.1.1.3.0	A1010220 0002	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00
1.1.1.1.3.0	A1010220 0003	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00
1.1.1.1.3.0	A1010220 0004	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00
1.1.1.1.3.0	A1010220 0005	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00
1.1.1.1.3.0	A1010220 0006	Concrete-Rectar	Concrete-Rectangular Beam - 12 x (		$61,14	1,00	Volume	ft³	[Volume]	[FAMILY] = 'Concret	$0,00	$0,00

UNIT PRICES AND QUANTITY FORMULAS ARE FINE-TUNED IN EXCEL SPREADSHEET

Cost Editor

BEXEL MANAGER

Classification Editor | Cost Item Definitions | Resources

BEXEL MANAGER COST CLASSIFICATION

UNIT PRICES

QUANTITY FORMULAS

ELEMENT QUERIES

New Classification | Uniformat Cost Classification

Expand All | Collapse All | New | Creation Wizard | Delete | Edit | Auto Assign | Assigned | Check Applicable Elements

Code	Name	Cost Items Count	Unit Cost	Daily Output	Quantity Type	Quantity Unit	Quantity Formula	Element Query
Enter text to search								
Uniformat Cost Classification	Uniformat Cost Classification	1919						
A	Substructure	34						match(['Assembly Code'], '^(.{0}A.*)')
A10	Foundations	34						match(['Assembly Code'], '^(.{0}A10.*)')
A1010	Standard Foundations	27						match(['Assembly Code'], '^(.{0}A1010.*)')
A1010100	Footings & Pile Caps	11						match(['Assembly Code'], '^(.{0}A1010100.*)')
A1010200	Foundation Walls	4						match(['Assembly Code'], '^(.{0}A1010200.*)')
A1010200 0001	Basic - Foundation - 12" Concrete		$69.40	1	Volume	ft³	[Volume]	[FAMILY] = 'Basic - Foundation - 12" Concrete'
A1010200 0002	Basic - Concrete - 8" - Foundation		$69.40	1	Volume	ft³	[Volume]	[FAMILY] = 'Basic - Concrete - 8" - Foundation'
A1010200 0003	Basic - Concrete - 16" - Foundation		$69.40	1	Volume	ft³	[Volume]	[FAMILY] = 'Basic - Concrete - 16" - Foundation'

5D BIM COST ESTIMATION - LEVEL 2&3

BEXEL powered by BEXELMANAGER

QUANTITY TAKEOFF

Breakdown
- Project
  - Group by Property 'UniFormat' [0, 1] — LEVEL 01
    - Group by Property 'UniFormat' [0, 3] — LEVEL 02
      - Group by Property 'UniFormat' [0, 5] — LEVEL 03
        - Group by Property 'UniFormat' [0, 8] — LEVEL 04
          - Group by Property 'UniFormat' — LEVEL 05
            - Quantities
              - Count
              - Volume (Sum)
              - Area (Sum)

UNIFORMAT BREAKDOWN

Breakdown
- Project
  - Group by Property 'DIN 276 Code' [0, 1] — LEVEL 01
    - Group by Property 'DIN 276 Code' [0, 2] — LEVEL 02
      - Group by Property 'DIN 276 Code' — LEVEL 03
        - Group by Family — LEVEL 04
          - Quantities
            - Count
            - Volume (Sum)
            - Area (Sum)
            - Length (Sum)

DIN 276 AND MODEL BASED BREAKDOWN

Breakdown
- Project
  - Group by Selection Sets: '01_Structural Worl — LEVEL 01
    - Group by Property 'IFC Entity' — LEVEL 02
      - Group by Property 'IFC Name' — LEVEL 03
        - Quantities
          - Count
          - Area (Sum)
          - Volume (Sum)
          - Length (Sum)

IfcEntity
IfcObjectType
IfcMaterial
IfcProduct
Dimensions or other key properties (optional)

IFC BASED BREAKDOWN

COST CLASSIFICATION

UNIFORMAT COST CLASSIFICATION

Uniformat Cost Classification	Uniformat Cost Classification
A	Substructure
B — LEVEL 01	Shell
B10 — LEVEL 02	Superstructure
B1010 — LEVEL 03	Floor Construction
B1010200 — LEVEL 04	Upper Floor Framing - Vertical Ele
B1010200 0001 — LEVEL 05	Concrete_Column_Square_CH_I -
B1010200 0002	W-Wide Flange-Column - W8X31
B1010200 0003	Concrete_Column_Square_CH_I -
B1010200 0004	W-Wide Flange-Column - W18x1
B1010200 0005	W-Wide Flange-Column - W18X1
B1010200 0006	W_Wide_Flange_Column_CH_I - W
B1010200 0007	W_Wide_Flange_Column_CH_I - W
B1010200 0008	Steel_Base_Plate_CH_I - BP2

DIN 276 AND MODEL BASED COST CLASSIFICATION

DIN 276 FINAL	DIN 276 FINAL
300 — LEVEL 01	BAUWERK-BAUKONSTRUKTIONEN - BUILDING CONSTRUCTIONS
320 — LEVEL 02	GRÜNDUNG - FOUNDING
322 — LEVEL 03	Flachgründungen - Shallow foundatio
324	Unterböden - Sub-floors
329	Gründung, sonstiges - Foundation, oth
329-001 — LEVEL 04	Basiswand:- JBA_MW 115_innen_ntr_F
329-002	Basiswand:- JBA_STB 300 WU Einbringsschacht_ außen_FXX
329-003	JBA_Tür 1 Flug:Stahlblechtür 2,26 x 0,9 Außen
329-004	Lüftungs Erdkanal Eingang:Lüftungs Erdkanal Eingang

IFC BASED COST CLASSIFICATION

QTO Based Classification	QTO Based Classification
1	01_Structural Works
2 — LEVEL 01	02_Architectural Works
2.1 — LEVEL 02	IfcBeam
2.1.1 — LEVEL 03	L profil 152x102x12.7 mm - L profil 152x102x12.7 mm
2.1.2	L profil 60x60x10 mm - L profil 60x60x10 mm
1	01_Structural Works
1.1	IfcBeam
1.1.1 — LEVEL 04 (optional)	01_Formwork
1.1.1.0	preklada- nosilci- polica: preklada- nosilci- polica 50/28cm
1.1.1.1	Concrete-Rectangular Beam: 20 x 14
1.1.1.11	preklada- nosilci: preklada- nosilci 170/20cm
1.1.1.12	preklada- nosilci: preklada- nosilci 20/28cm
1.1.1.13	preklada- nosilci: preklada- nosilci 30/40cm
1.1.1.14	preklada- nosilci: preklada- nosilci 30/80cm
1.1.1.15	preklada- nosilci: preklada- nosilci 40/30cm
1.1.1.16	preklada- nosilci: preklada- nosilci 50/10cm
1.1.1.17	preklada- nosilci: preklada- nosilci 50/46cm

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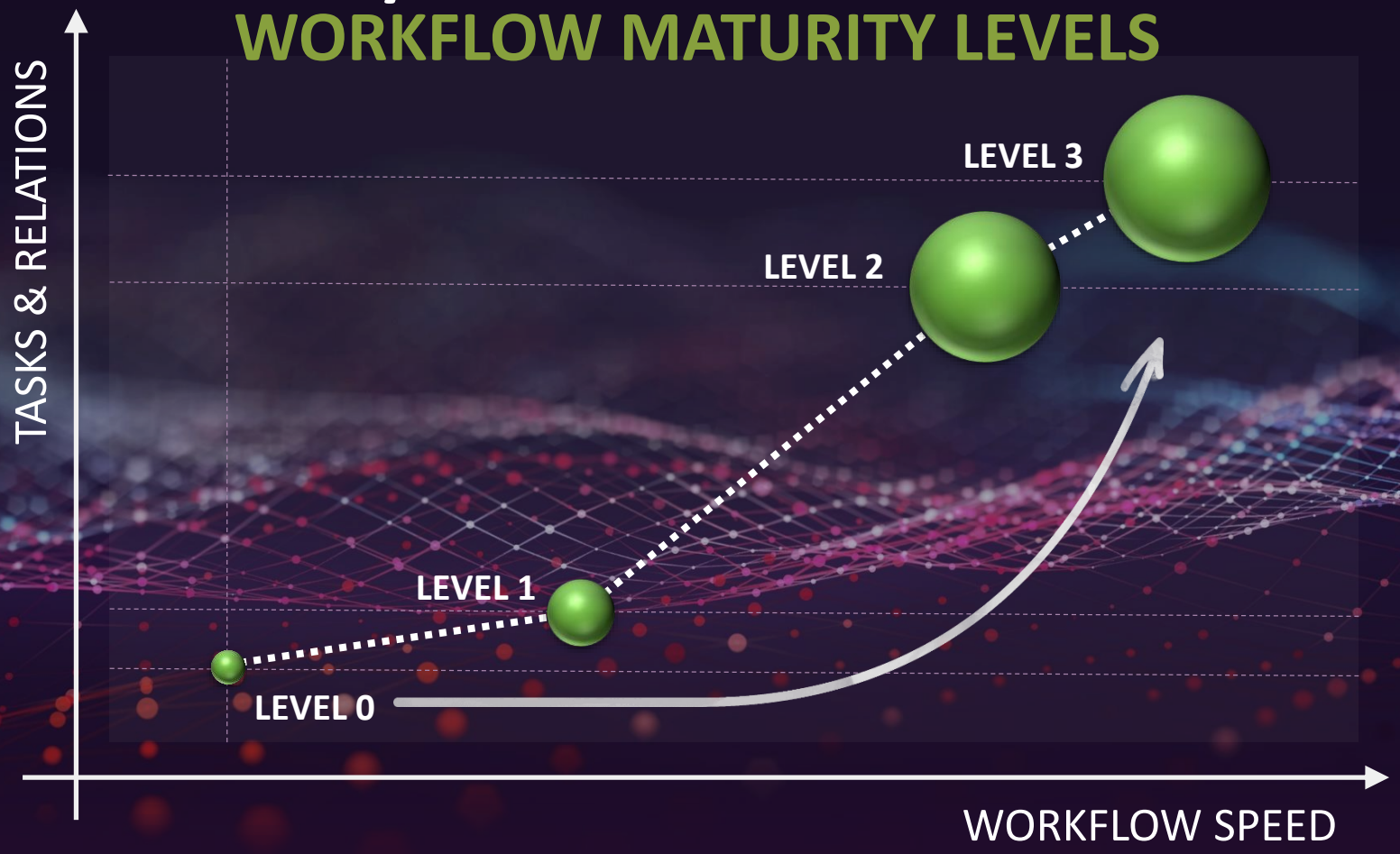
4D/5D BIM PLANNING

WORKFLOW MATURITY LEVELS



NUMBER OF DATA DOMAINS:

- TASKS • QUANTITIES • AUTO-MATCHING ATTRIBUTES • SMART COST ITEMS
- METHODOLOGIES • RELATIONS • RESOURCES • ACTIVITY QUANTITIES
- SUBCONTRACTORS • PROCUREMENT • DATA-DRIVEN ADVANCED ANALYTICS • ZONES

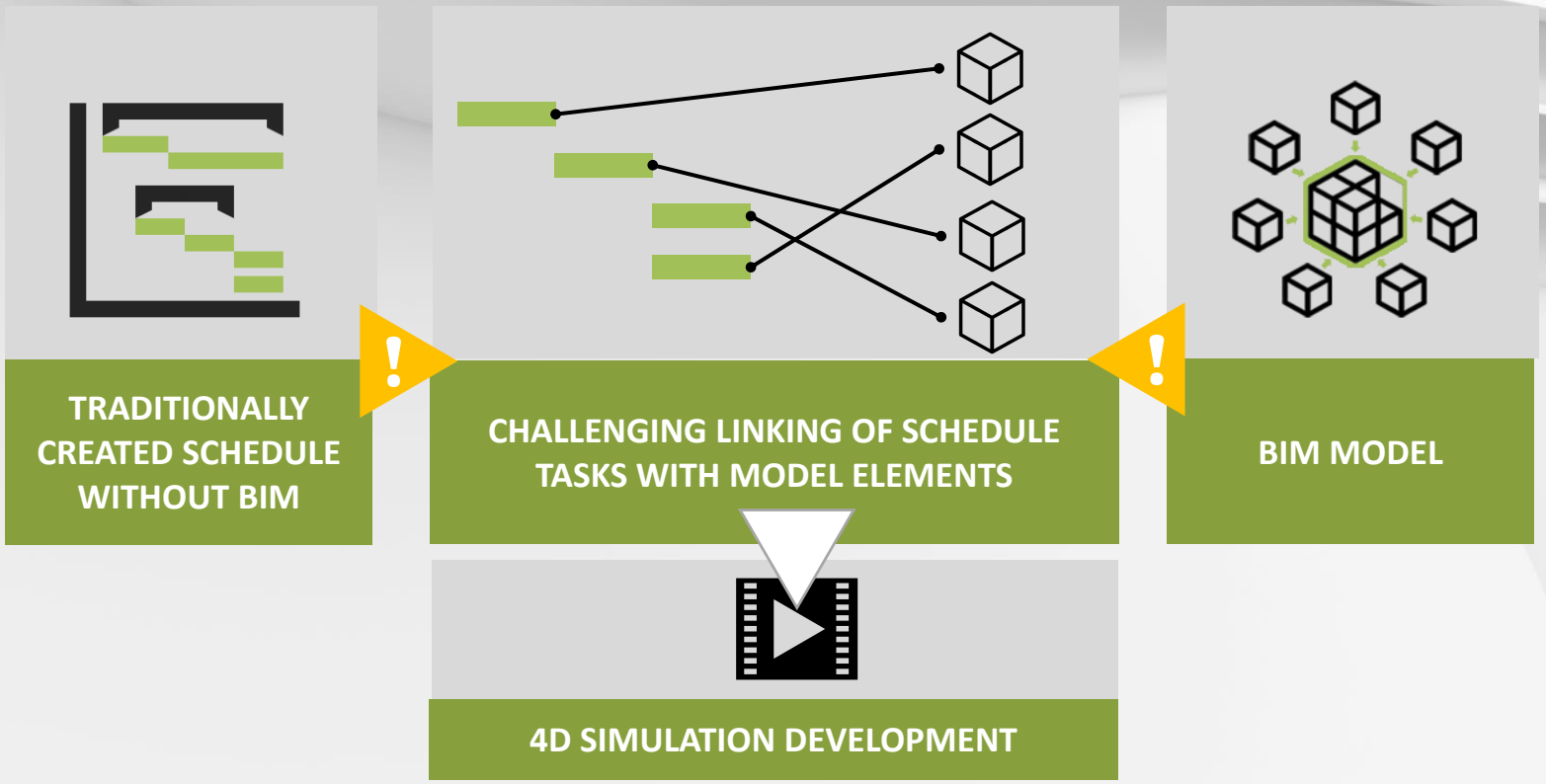
4D BIM PLANNING - LEVEL 0

BEXEL powered by BEXELMANAGER

BENEFITS:

UNDERSTANDING OF CONSTRUCTION PROCESS

IDENTIFICATION OF CONSTRUCTION CONFLICTS AND SAFETY ISSUES



CHALLENGES:

MANUALLY CREATING THOUSANDS OF TASKS AND RELATIONS

TASKS USUALLY DO NOT CONTAIN QUANTITIES, RESOURCES AND COSTS, OR TOP-DOWN COSTS ARE ADDED AS A ROUGH ESTIMATE

MANUAL CREATION OF SELECTION SETS OR ADDITIONAL NECESSARY PROPERTIES IN THE BIM MODEL

NOT ALIGNED SCHEDULE WITH THE BIM MODEL, MAKING VERY CHALLENGING LINKING OF SCHEDULE TASKS WITH MODEL ELEMENTS

MANUAL UPDATES OF ALL ANALYSES THAT CANNOT COPE WITH PROGRESS AND DESIGN UPDATES

SCHEDULES CONTAIN LIMITED NUMBER OF TASKS

PRIMARILY USED FOR MARKETING AND PRESENTATION PURPOSES

4D BIM PLANNING - LEVEL 1

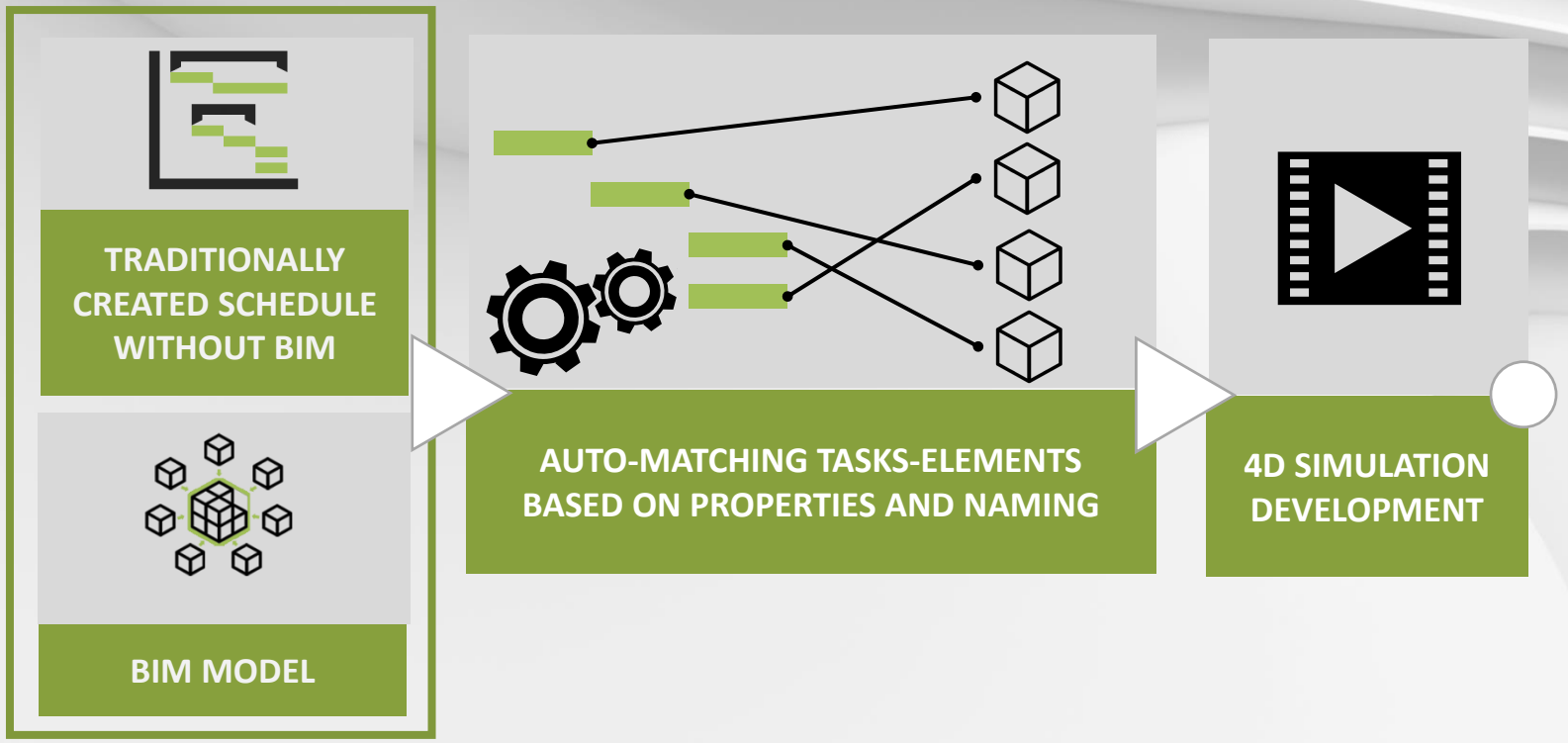
BEXEL powered by BEXELMANAGER

BENEFITS:

3X FASTER THAN 4D/5D BIM PLANNING LEVEL 0

UNDERSTANDING OF CONSTRUCTION PROCESS

IDENTIFICATION OF CONSTRUCTION CONFLICTS AND SAFETY ISSUES



DEVELOPED FOLLOWING BEP
(ATTRIBUTES, NAMING CONVENTION)

CHALLENGES:

MANUALLY CREATING THOUSANDS OF TASKS AND RELATIONS

TASKS USUALLY DO NOT CONTAIN QUANTITIES, RESOURCES AND COSTS, OR TOP-DOWN COSTS ARE ADDED AS A ROUGH ESTIMATE

MANUAL CREATION OF SELECTION SETS OR ADDITIONAL NECESSARY PROPERTIES IN THE BIM MODEL

~~NOT ALIGNED SCHEDULE WITH THE BIM MODEL, MAKING VERY CHALLENGING LINKING OF SCHEDULE TASKS WITH MODEL ELEMENTS~~

MANUAL UPDATES OF ALL ANALYSES THAT CANNOT COPE WITH PROGRESS AND DESIGN UPDATES

SCHEDULES CONTAIN LIMITED NUMBER OF TASKS

PRIMARILY USED FOR MARKETING AND PRESENTATION PURPOSES

BEXEL buildingSMART Multinational Member BEXEL MANAGER

4D BIM PLANNING - LEVEL 2

BEXEL powered by BEXELMANAGER

IFC BIM MODEL

IfcEntity
IfcObjectType
IfcMaterial
IfcProduct
Dimensions or other key properties

CAPTURED EXPERT LOGIC

MANAGE TEMPLATES - EXCHANGE (IMPORT/FINE-TUNE/EXPORT)

- SMART SELECTION SETS
- CUSTOM BREAKDOWN STRUCTURE
- CONSTRUCTION METHODOLOGY
- COST CLASSIFICATION
- SCHEDULE CREATION TEMPLATE

GENERATE CUSTOM BREAKDOWN STRUCTURE → ZONES

IMPORT/CREATE COST VERSION → METHODOLOGIES

CREATION TEMPLATE

AUTOGENERATE SCHEDULE → SCHEDULE FINE-TUNING

ADD/CHANGE/DELETE:
NON-BIM TASKS, RELATIONS, DURATION

FLOWLINE | RESOURCE LEVELING

SCHEDULE OPTIMISATION

4D/5D SIMULATION DEVELOPMENT

MULTIPLE SCHEDULE VERSIONS

*ACCORDING TO ISO 21511

BENEFITS:

10X-15X FASTER THAN 4D/5D BIM PLANNING LEVEL 1

REUSABILITY

CAPTURING EXPERTS LOGIC

DETAILED SCHEDULE

AUTOMATED UPDATES

SAFETY MEASURES DEFINED IN METHODOLOGIES

FLEXIBLE APPROACH

EXPORT/ REPORT

- IFC
- POWER BI
- ORACLE PRIMAVERA
- MS PROJECT
- EXCEL

CHALLENGES:

MANUAL DEFINING ZONES AS ATTRIBUTES DURING MODEL DEVELOPMENT

4D BIM PLANNING - LEVEL 3

BEXEL powered by BEXELMANAGER

IFC BIM MODEL

IfcEntity
IfcObjectType
IfcMaterial
IfcProduct
Dimensions or other key properties

CAPTURED EXPERT LOGIC

MANAGE TEMPLATES - EXCHANGE (IMPORT/FINE-TUNE/EXPORT)

- SMART SELECTION SETS
- CUSTOM BREAKDOWN STRUCTURE
- CONSTRUCTION METHODOLOGY
- COST CLASSIFICATION
- SCHEDULE CREATION TEMPLATE

GENERATE CUSTOM BREAKDOWN STRUCTURE → ZONES

IMPORT/CREATE COST VERSION → METHODOLOGIES

CREATION TEMPLATE

AUTOGENERATE SCHEDULE → SCHEDULE FINE-TUNING

ADD/CHANGE/DELETE:
NON-BIM TASKS, RELATIONS, DURATION

FLOWLINE | RESOURCE LEVELING

SCHEDULE OPTIMISATION

4D/5D SIMULATION DEVELOPMENT → MULTIPLE SCHEDULE VERSIONS

*ACCORDING TO ISO 21511

LEVEL 3

CONTAINMENT CLASH

PROJECT SPECIFIC ZONES → RELATIONS → DATA ENRICHMENT

BENEFITS:

1.5X FASTER THAN 4D/5D BIM PLANNING LEVEL 2

REUSABILITY

CAPTURING EXPERTS LOGIC

DETAILED SCHEDULE

AUTOMATED UPDATES

SAFETY MEASURES DEFINED IN METHODOLOGIES

FLEXIBLE APPROACH

EXPORT/ REPORT

- IFC
- POWER BI
- ORACLE PRIMAVERA
- MS PROJECT
- EXCEL

NEXT GENERATION OF DIGITAL CONSTRUCTION MANAGEMENT

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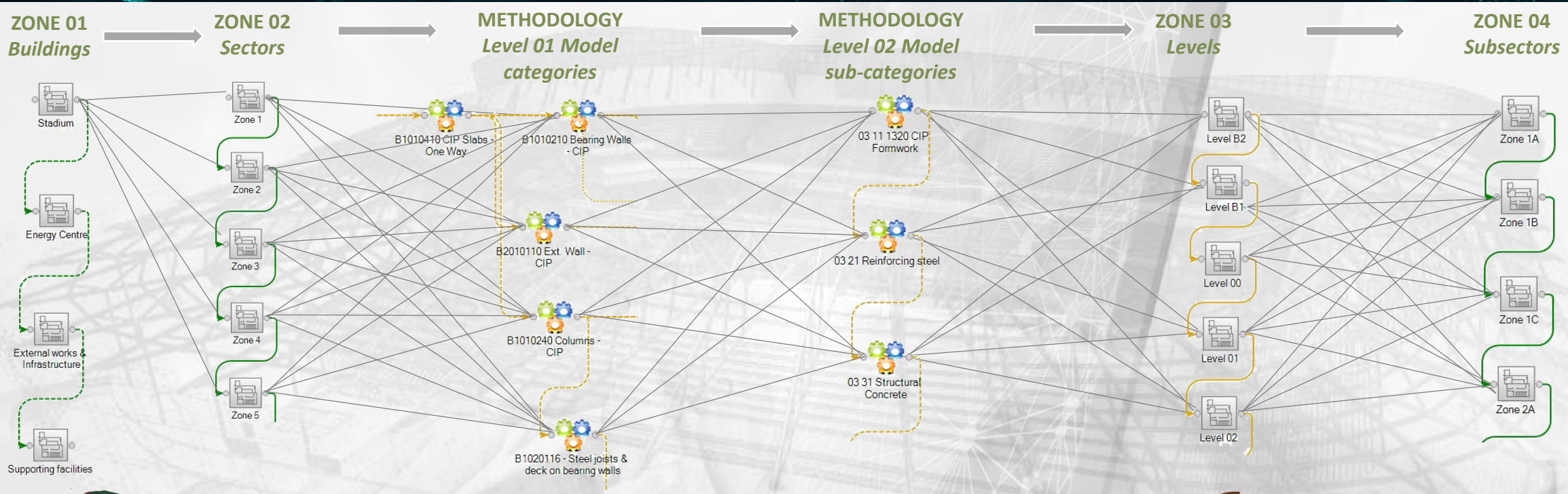
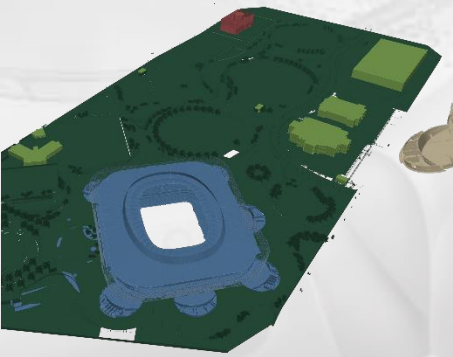
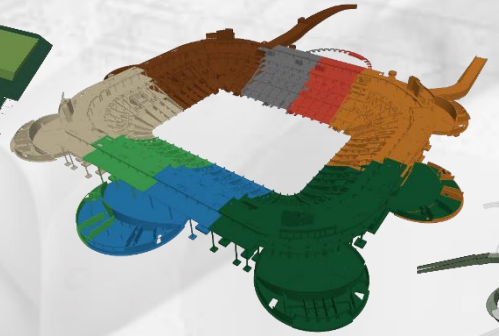
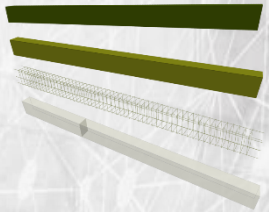
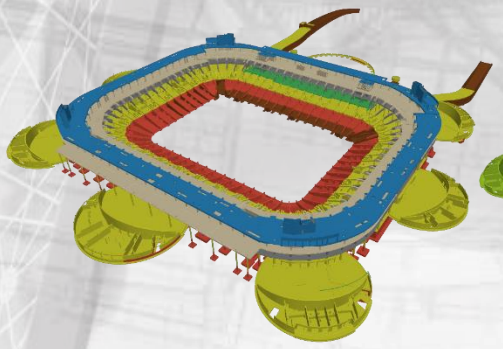


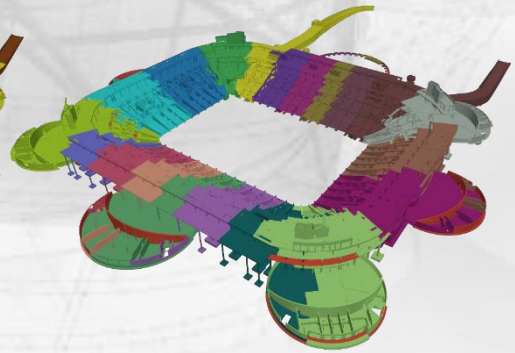






Concrete finishing
Concrete pouring
Reinforcement
Formwork





SCAN OR CLICK QR CODE FOR VIDEO LINK

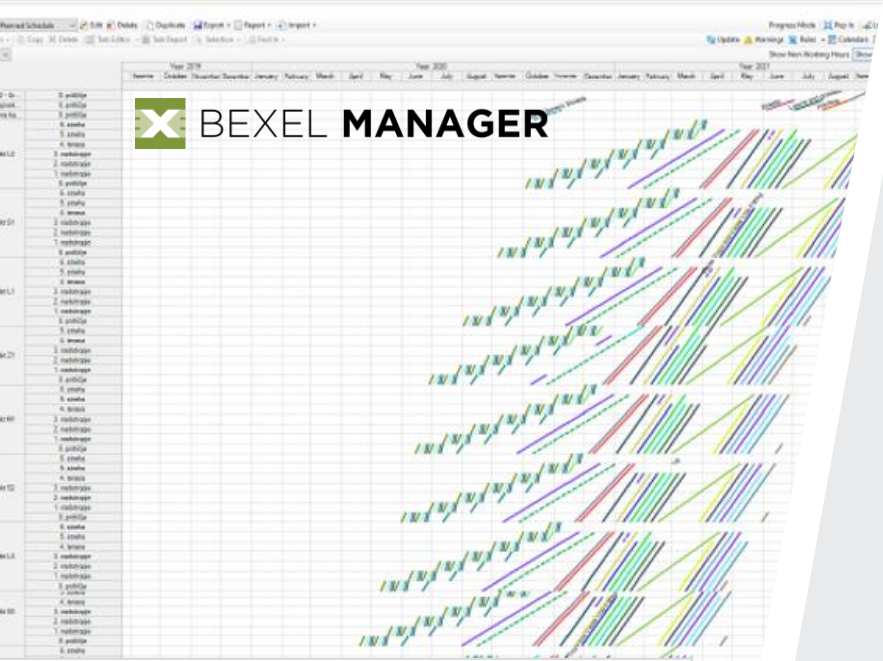
BEXEL Manager - BIM 4D/5D Maturity Level 3 in Practice

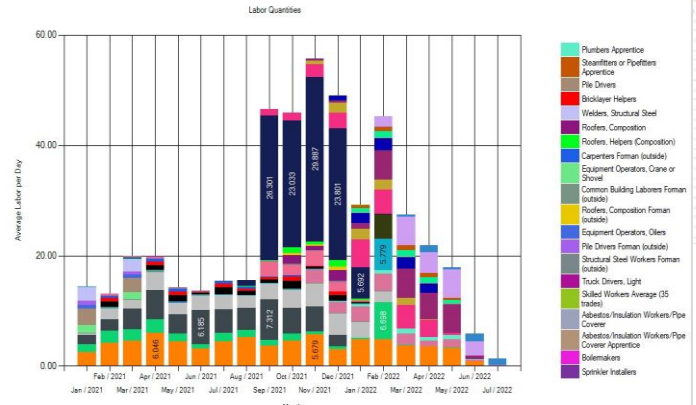
SPECIFIC BENEFITS OF USING BIM TECHNOLOGY 4D/5D – LINE OF BALANCE (LOB)

BEXEL powered by BEXELMANAGER

SCAN OR CLICK QR CODE FOR VIDEO LINK

BEXEL Manager - Advanced smart planning on a range of different projects





RESOURCES OPTIMIZATION

- *RESOURCES CAN BE OPTIMISED FOR A LARGE NUMBER OF REPEATED WORK ACTIVITIES*
- *AS ALL INFORMATION IS AVAILABLE FOR EACH ACTIVITY, IT ALLOWS EASIER COST AND TIME OPTIMISATION ANALYSIS.*

HIGH PRODUCTIVITY RATES

- *ALLOWING A CLEARER UNDERSTANDING OF THE AMOUNT OF WORK TAKING PLACE AT A CERTAIN TIME IN A SPECIFIC PLACE.*

MONITORING WORK STANDARDS

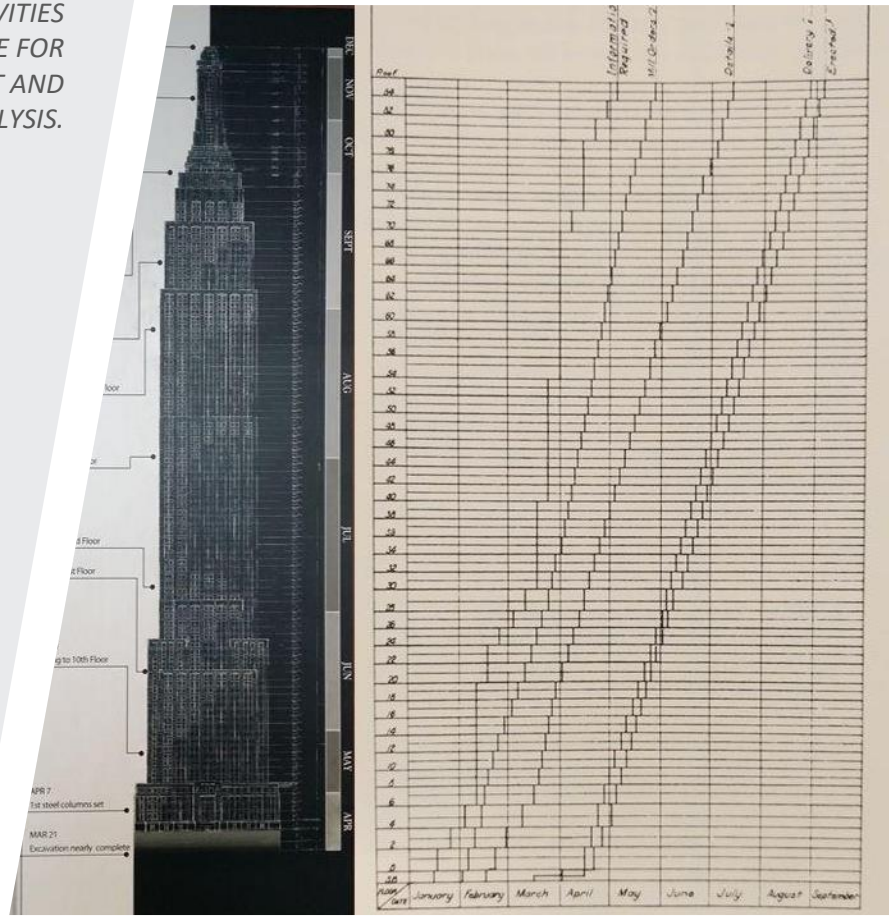
- *IT ALLOWS BETTER MANAGEMENT OF SUBCONTRACTORS AND RESOURCES.*

PROBLEM AREAS IDENTIFIED IN ADVANCE

- *LOB ALLOWS PROBLEM AREAS TO BE IDENTIFIED IN ADVANCE*
- *IT IS RELATIVELY EASY TO MODIFY, UPDATE AND CHANGE THE SCHEDULE.*

MAINTAIN CONTINUOUS WORK WITHOUT STOPPAGE

ADOPT EASY AND EFFECTIVE THE LINE OF BALANCE (LOB) SCHEDULING



THE TALLEST BUILDING IN THE WORLD FOR DECADES, BUILT UNDER BUDGET AND AHEAD OF SCHEDULE USING A SCHEDULE THAT CLOSELY RESEMBLES A LINE OF BALANCE SCHEDULE

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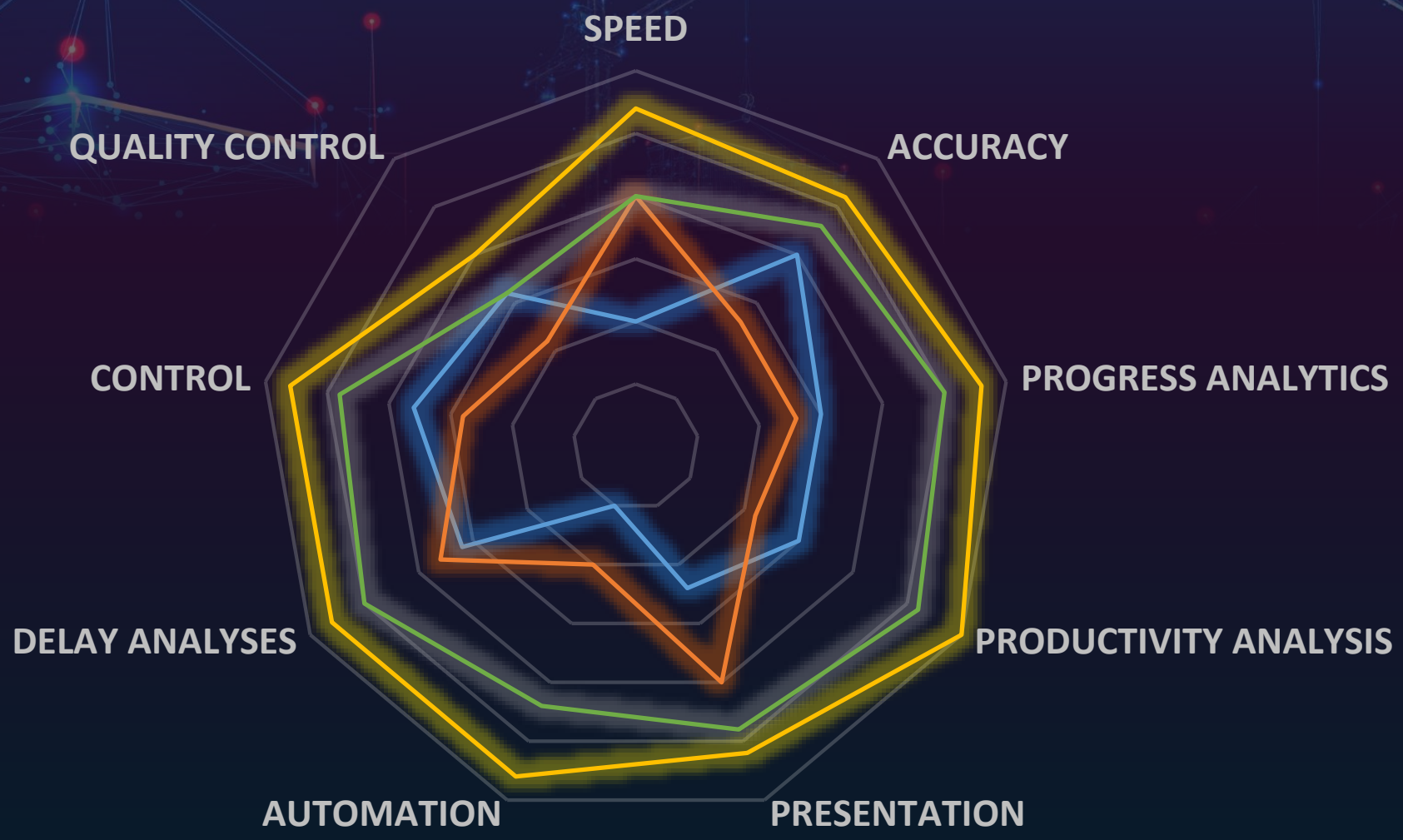
4D/5D BIM PROGRESS MONITORING

WORKFLOW MATURITY LEVELS



—LEVEL 0 —LEVEL 1 —LEVEL 2 —LEVEL 3

4D/5D BIM PROGRESS MONITORING - LEVEL 0

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BIM MODEL

2D PROGRESS INFORMATION FROM SITE

!

MANUAL ELEMENT SELECTION

!

ELEMENT PROGRESS QUANTIFICATION AND VISUALISATION

!

EXCEL SPREADSHEET TABLE WITH MANUAL PROGRESS ENTRY

!

WRITING PROGRESS REPORTS

BENEFITS:

CLEAR PROGRESS VISUALISATION AND MORE INFORMATIVE REPORTING

CHALLENGES:

LABOR INTENSIVE PROGRESS INPUT

MANUAL PAYMENT CERTIFICATES

NO RESOURCE PRODUCTIVITY ANALYSIS

BIM USED ONLY AS A SUPPLEMENTARY SOURCE FOR MANUAL PROGRESS ANALYSES

LABOR INTENSIVE UPDATE PROCESS AND CLAIM MANAGEMENT

4D/5D BIM PROGRESS MONITORING - LEVEL 1

BEXEL powered by BEXELMANAGER

2D PROGRESS INFORMATION FROM SITE

!

MANUAL PROGRESS PERCENTAGE CALCULATION AND ENTRY

!

4D/5D BIM MODEL WITH PROGRESS PERCENTAGE

APROXIMATE PLANNED VS ACTUAL 4D SIMULATION FOR PRESENTATION

PROGRESS REPORTS

CHALLENGES:

LABOR INTENSIVE PROGRESS CALCULATION

MANUAL PAYMENT CERTIFICATES

NO RESOURCE PRODUCTIVITY ANALYSIS

BIM USED ONLY FOR PRESENTATION PURPOSES

ROUGH PROGRESS EVALUATION AND ANALYSIS

LACK OF DATA FOR DISPUTES AND CLAIM MANAGEMENT

LABOR INTENSIVE UPDATE PROCESS

BENEFITS:

PROGRESS VISUALISATION AND MORE INFORMATIVE REPORTING

ENGAGING PLANNED VS ACTUAL SIMULATION AND PROGRESS PRESENTATION

4D/5D BIM PROGRESS MONITORING - LEVEL 2

BEXEL powered by BEXELMANAGER

4D/5D BIM MODEL

BIM LOOK-AHEAD PLANS

LOOK-AHEAD PLANS:
DAILY / WEEKLY / MONTHLY / ANY INTERVAL
GENERATED BY:

- SUBCONTRACTORS
- ACTIVITIES (TYPES OF WORKS)
- LABOR
- CLASSIFICATION
- ANY BREAKDOWN STRUCTURE

PROGRESS INPUT FROM CONSTRUCTION SITE

SELECTION OF EXECUTED BIM ELEMENTS

EXCHANGE FILES:

- DIRECT INPUTS
- BCF
- CDE
- API

CREATE PROGRESS ENTRY

ACTUAL UPDATED CONSTRUCTION SCHEDULE

PROGRESS REPORTS, EARNED VALUE ANALYSIS , KPIs

PLANNED VS ACTUAL 4D/5D SIMULATION

MONTHLY PAYMENT CERTIFICATE

- IFC
- POWER BI
- ORACLE PRIMAVERA
- MS PROJECT
- EXCEL

CHALLENGES:

MANUAL FINE-TUNING OF LOOK-AHEAD PLANS FOR EXECUTED WORK INPUTS AND COLLECTION ACTUAL RESOURCE DATA

BENEFITS:

DATA-DRIVEN DECISION MAKING

EFFICIENT MONTHLY PAYMENT CERTIFICATION PROCESS

FULL PROJECT INSIGHTS WITH EVA & KPIs

INTEGRATION WITH ERP SYSTEMS

FACILITATED DISPUTES AND CLAIM MANAGEMENT

EFFICIENCY & PRODUCTIVITY TRACKING AND ANALYSIS

PRECISE VISUALISATIONS

4D/5D BIM PROGRESS MONITORING - LEVEL 3

BEXEL powered by BEXELMANAGER

4D/5D BIM MODEL

BIM LOOK-AHEAD PLANS

LOOK-AHEAD PLANS:
DAILY / WEEKLY / MONTHLY / ANY INTERVAL
GENERATED BY:

- SUBCONTRACTORS
- ACTIVITIES (TYPES OF WORKS)
- LABOR
- CLASSIFICATION
- ANY BREAKDOWN STRUCTURE

PROGRESS INPUT FROM CONSTRUCTION SITE

SELECTION OF EXECUTED BIM ELEMENTS

EXCHANGE FILES:

- DIRECT INPUTS
- BCF
- CDE
- API

CREATE PROGRESS ENTRY

ACTUAL UPDATED CONSTRUCTION SCHEDULE

PROGRESS REPORTS, EARNED VALUE ANALYSIS , KPIs

PLANNED VS ACTUAL 4D/5D SIMULATION

MONTHLY PAYMENT CERTIFICATE

- IFC
- POWER BI
- ORACLE PRIMAVERA
- MS PROJECT
- EXCEL

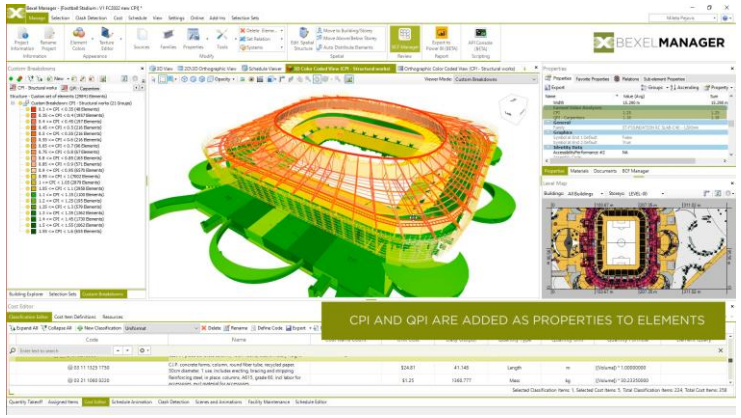
LEVEL 3

AUTOMATED IDENTIFICATION OF EXECUTED WORKS USING LASER SCANNING, SENSORS
RFID RESOURCE TRACKING
SEMI-AUTOMATED QUALITY INSPECTIONS
(TOLERANCES, IDENTIFICATION OF QUALITY FAULS)

BENEFITS:

DATA-DRIVEN DECISION MAKING
EFFICIENT MONTHLY PAYMENT CERTIFICATION PROCESS
FULL PROJECT INSIGHTS WITH EVA & KPIs
INTEGRATION WITH ERP SYSTEMS
FACILITATED DISPUTES AND CLAIM MANAGEMENT
EFFICIENCY & PRODUCTIVITY TRACKING AND ANALYSIS
PRECISE VISUALISATIONS

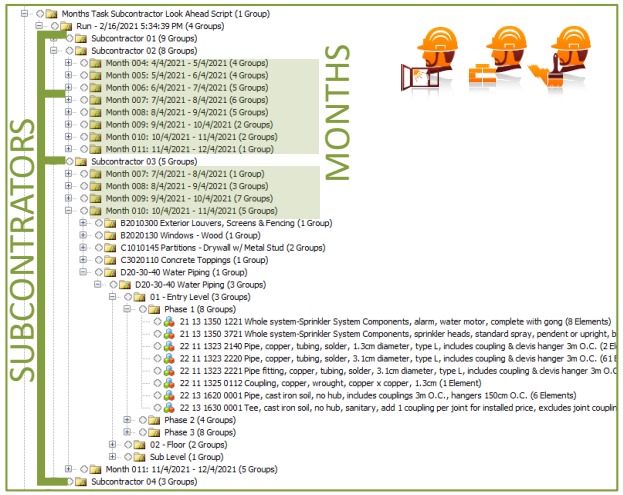
BEXEL powered by BEXELMANAGER

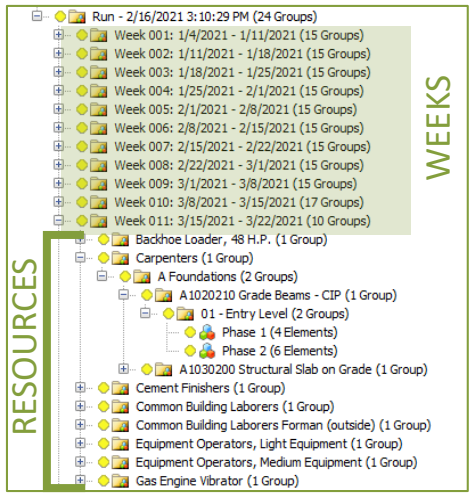


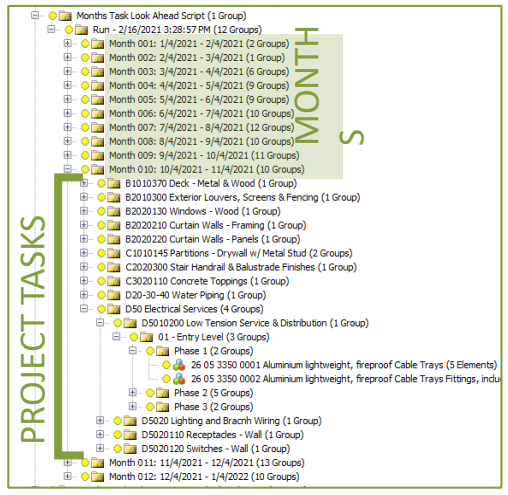
COLOR-CODED VISUALIZATIONS ACCORDING TO:

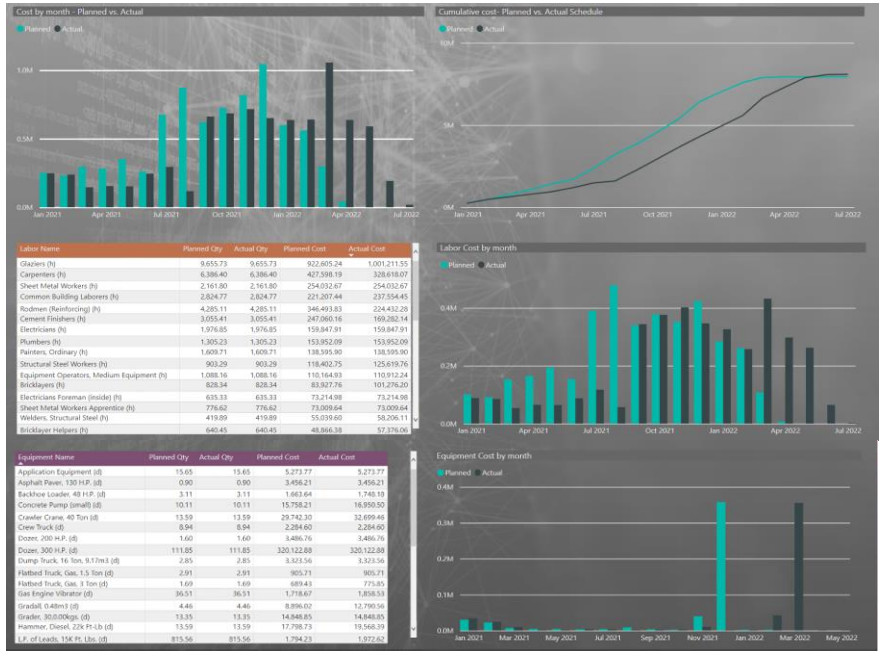
- **COST PERFORMANCE INDEX**
- **SCHEDULE PERFOMANCE INDEX**
- **RESOURCE PERFOMANCE INDEXES**

LOOK-AHAED PLAN GENERATED BY: • SUBCONTRACTORS • ACTIVITIES (TYPES OF WORKS) • LABOR • CLASSIFICATIONCOST STRUCTURE • PROJECT TASK • ANY BREAKDOWN STRUCTURE





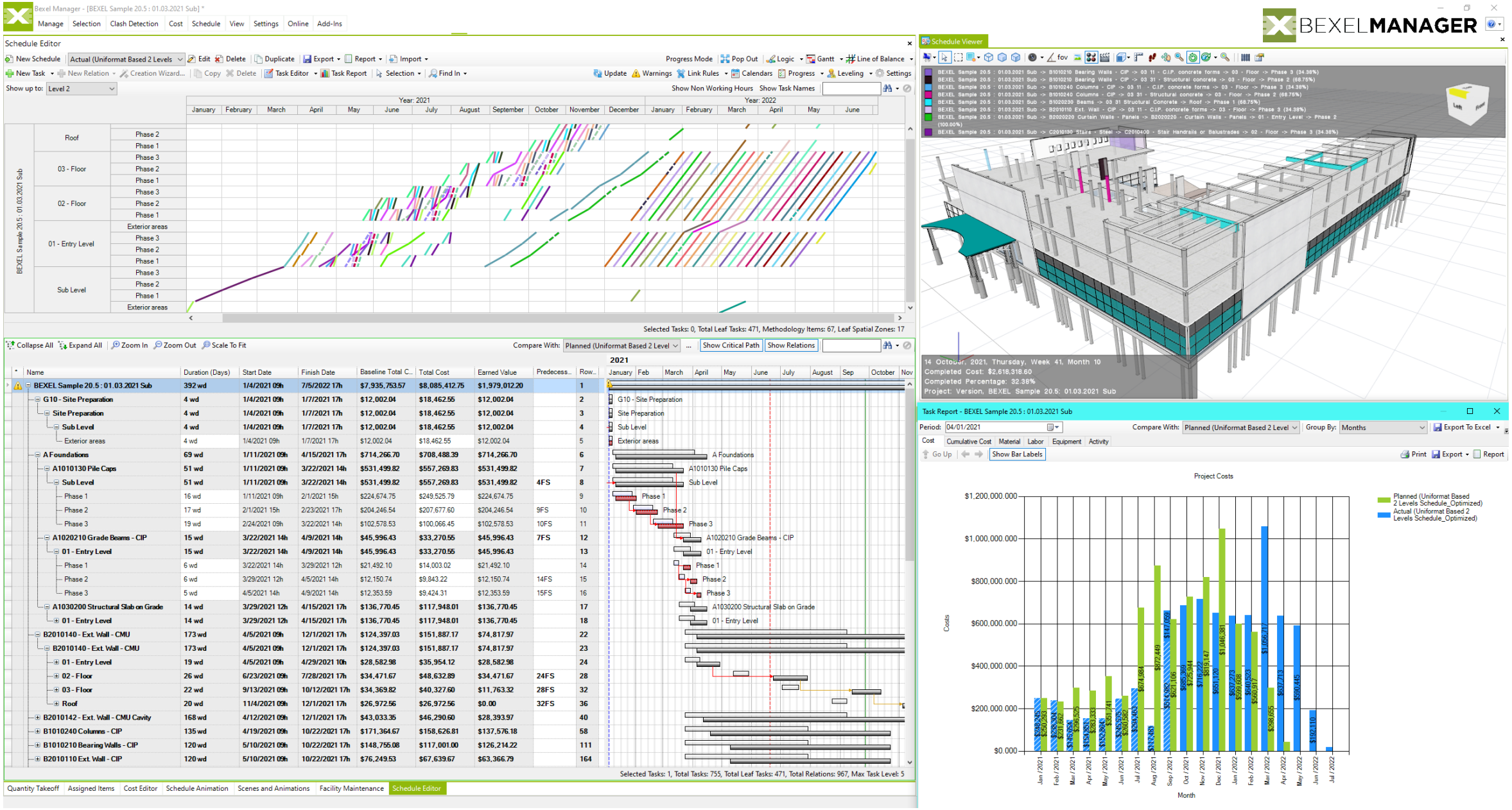




SUBCONTRATORS **RESOURCES** **PROJECT TASKS**

BEXEL SINGLE SOURCE OF TRUTH

BEXEL powered by BEXELMANAGER



LOOK AHEAD TO PROGRES WORKFLOW

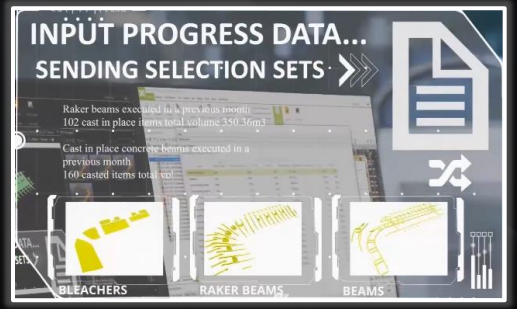
BEXEL powered by BEXELMANAGER

CONSTRUCTION MANAGEMENT BY DATA-DRIVEN DECISION MAKING

FULL INSIGHT INTO PROJECT IMPLEMENTATION WITH KPIs

EFFICIENT MONTHLY PAYMENT CERTIFICATION PROCESS

RESOURCE AND SUBCONTRACTOR PRODUCTIVITY TRACKING



BIM-BASED PROJECT CONTROL

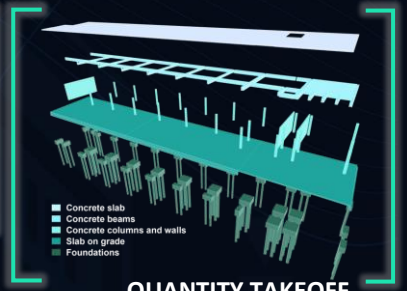
ISO 12006-2 Organization of information
ISO 12006-3 about construction works

PROJECT MANAGEMENT BIM REPORTING

BEXEL powered by BEXELMANAGER

- DATA VALIDATION REPORTS
  ACCORDING TO ANY AVAILABLE STANDARD AND IDS
- GEOMETRY VALIDATION REPORTS
- CLASH DETECTION REPORTS
- QUANTITY TAKEOFF REPORTS
  BROKEN DOWN BY VARIOUS CRITERIA
- COST REPORTS
- SCHEDULE REPORTS
- LOOK-AHEAD PLANS
- PROGRESS TRACKING REPORTS
  PLANNED VS ACTUAL REPORTS
- EARNED VALUE ANALYSES, KPIs REPORTS
- CHANGE MANAGEMENT REPORTS
- PORTFOLIO MANAGEMENT REPORTS
- FM PLANNING AND TRACKING REPORTS

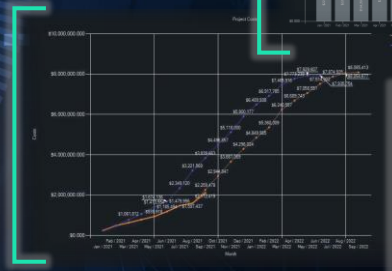
SCHEDULE REPORTS



QUANTITY TAKEOFF REPORTS

COST REPORTS

PROGRESS TRACKING REPORTS



FM PLANNING AND TRACKING REPORTS

COMMAND CENTER

DIGITALLY DRIVEN CONSTRUCTION

FOCUS ON THE ESSENCE OF CONSTRUCTION MANAGEMENT PROCESS

BEXEL powered by BEXELMANAGER

Choose Schedule

Actual (Uniformat Based 2 Levels Schedule_Optimized)

7,935,754	2,112,419	1,979,012	3,713,896	8,085,413	-133,407	-1,734,884
Baseline Cost	Actual Cost	Earned Value	Planned Value (St...	Total Cost	Cost Variance	Schedule Variance

9/27/2021
Status Date

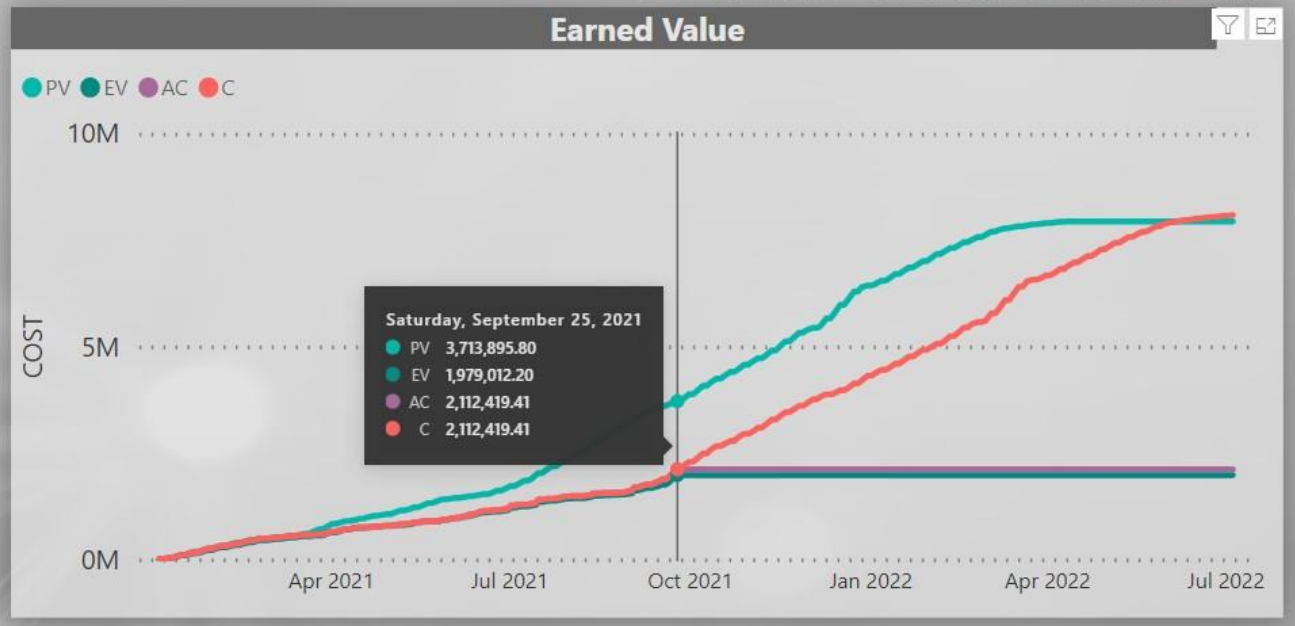
$
Currency

Completed Duration %

Completed Cost

Earned Value

P V - Planned Value, **E V** - Earned Value, **A C** - Actual Cost, **C** - Cost



C P I - Cost Performance Index, **S P I** - Schedule Performance Index, **V A C** - Variance At Completion

Task	Total Cost	Baseline Cost	Earned Value	Actual Cost	CPI	Cost Variance	SPI	Schedule Variance	VAC
Bexel Sample Project : v1	**8,085,412.75**	**7,935,753.57**	**1,979,012.20**	**2,112,419.41**	**0.94**	**-133,407.21**	**0.53**	**-1,734,883.60**	**-149,659.17**
A Foundations	**708,488.39**	**714,266.70**	**714,266.70**	**708,488.39**	**1.01**	**5,778.31**	**1.00**	**0.00**	**5,778.31**
A1010130 Pile Caps	**557,269.83**	**531,499.82**	**531,499.82**	**557,269.83**	**0.95**	**-25,770.02**	**1.00**	**0.00**	**-25,770.02**
Sub Level	557,269.83	531,499.82	531,499.82	557,269.83	0.95	-25,770.02	1.00	0.00	-25,770.02
A1020210 Grade Beams - CIP	**33,270.55**	**45,996.43**	**45,996.43**	**33,270.55**	**1.38**	**12,725.88**	**1.00**	**0.00**	**12,725.88**

AC CV SV EV CPI SPI VAC

COMMAND CENTER

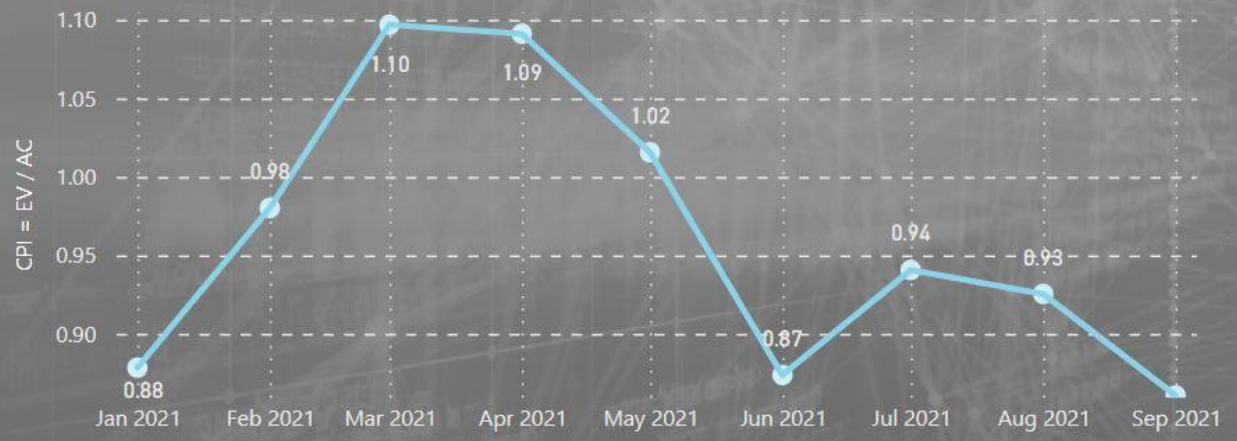
DIGITALLY DRIVEN CONSTRUCTION

FOCUS ON THE ESSENCE OF CONSTRUCTION MANAGEMENT PROCESS

BEXEL powered by BEXELMANAGER

Cost Performance Index

CPI



Schedule Performance Index

Project Management KPIs

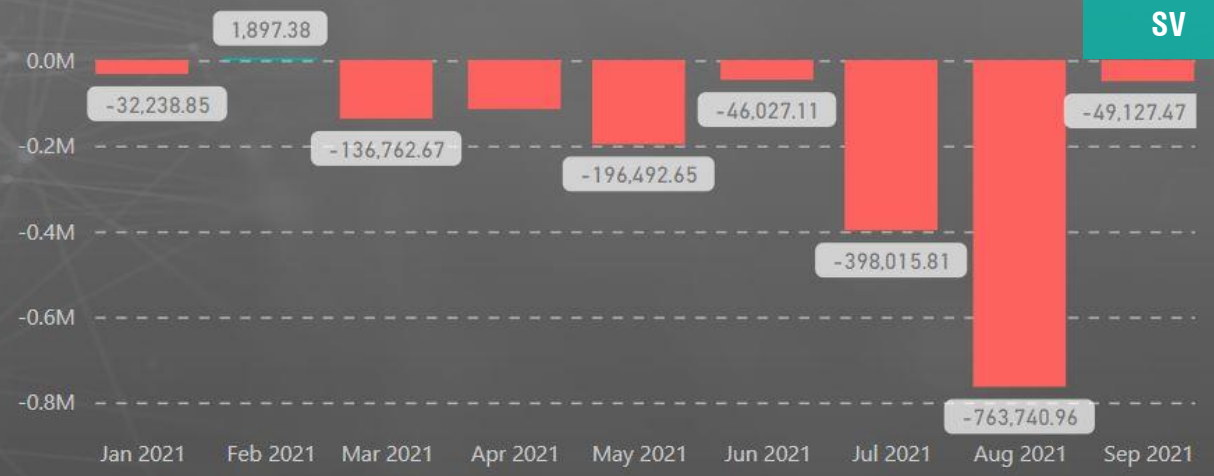
SPI

Cost Variance

CV

Schedule Variance

SV

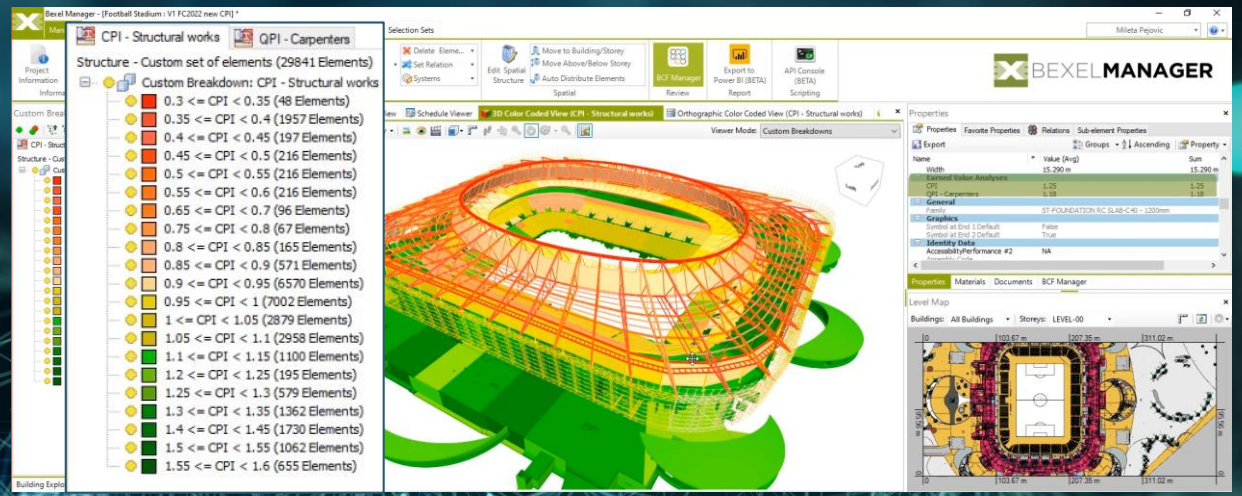


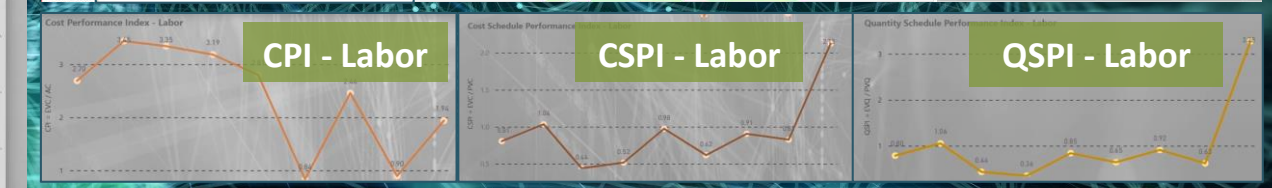
COMMAND CENTER

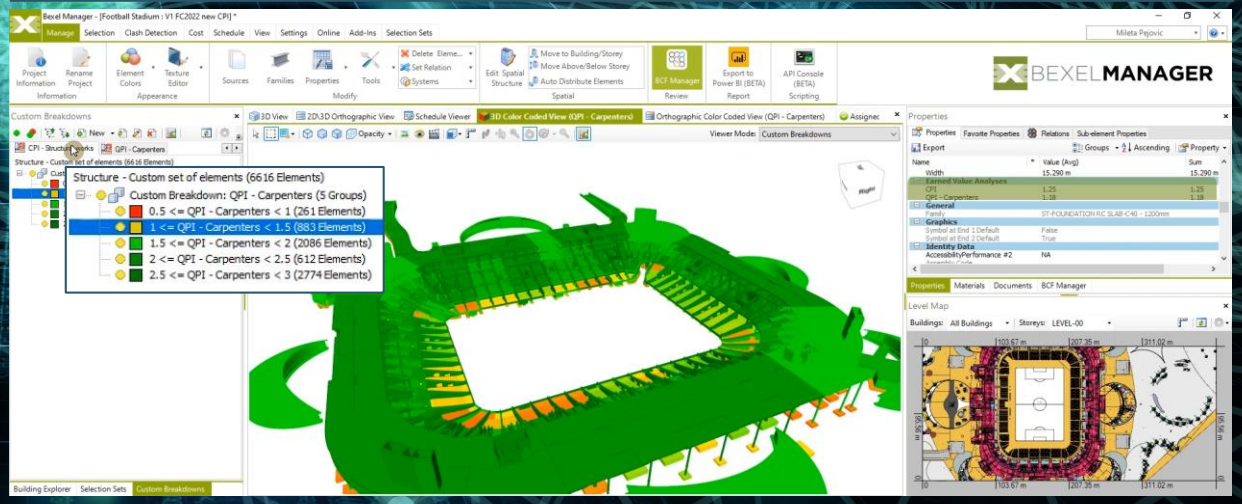
DIGITALLY DRIVEN CONSTRUCTION

FOCUS ON THE ESSENCE OF CONSTRUCTION MANAGEMENT PROCESS

BEXEL powered by BEXELMANAGER







CASE STUDY – 4D/5D PLANNING

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WEST 65 TOWER

150,000 M2
(TOWER 42,000 M2)

MORE THAN 400,000
MODEL ELEMENTS

INITIAL SCHEDULE TRADITIONALLY DEVELOPED **3 MONTHS**

MANUAL QUANTIFICATION & COST ESTIMATION **6 MONTHS**

SCHEDULE TASKS NOT RELATED TO QUANTITIES, RESOURCES AND COSTS

ERROR-PRONE BUDGETING AND PLANNING

15X FASTER BUDGET AND SCHEDULE DEVELOPMENT PROCESS

14% OPTIMIZED COSTS

74 DAYS SHORTENED CONSTRUCTION DURATION

88% OF TOTAL BUDGET GENERATED FROM BIM

12% BASED ON SQM/SPACE MODEL

100% INTEGRATED 4D/5D COST AND SCHEDULE

2 DAYS IDS & DATA ENRICHMENT TEMPLATES

1 HOUR DATA CHECKS & ENRICHMENT

4 HOURS DEFINING ZONES USING CONTAINMANT CLASH

DATA READY BIM MODEL

KNOWLEDGE MANAGEMENT

1 HOUR COST STRUCTURE GENERATION

2,300 BIM COST ITEMS

1 DAY FINE-TUNING COST ITEMS

BUDGET

1 HOUR BOQ GENERATION

9,800-LINE BIM BASED COST ESTIMATION

7 DAYS SUBCONTRACTORS BIDS ANALYSIS & INTEGRATION WITH COST DATABASE, OTHER COSTS & MARKUPS

4D/5D CONSTRUCTION SCHEDULE

1 DAY CONSTRUCTION METHODOLOGY

5,200 TASKS 75,000+ ACTIVITIES

2 DAYS WHAT IF SCENARIOS, RESOURCE LEVELING AND OPTIMISATION

1 HOUR SCHEDULE GENERATION

DETAILED AND OPTIMISED SCHEDULE WITH TASKS, ACTIVITIES, RESOURCES, QUANTITIES, FLOWLINE, CASH FLOWS & KPIs

CASE STUDY – 4D/5D PROGRESS MONITORING

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WEST 65 TOWER

150,000 M2
(TOWER 42,000 M2)

MORE THAN 400,000
MODEL ELEMENTS

5 DAYS ON-SITE PROGRESS INPUT DATA

7 DAYS PAYMENT CERTIFICATES

7 DAYS CONFIRMATION PROCESS OF MONTHLY PAYMENT CERTIFICATE

QUANTIFICATION ERRORS

NO RESOURCE PRODUCTIVITY ANALYSIS

OBSOLETE CONSTRUCTION SCHEDULES

LACK OF DATA FOR DISPUTE RESOLUTIONS

PROGRESS MONITORING

4D/5D CONSTRUCTION SCHEDULE

1 DAY MONTHLY BIM LOOK-AHEAD PLANS

1 DAY FINE-TUNING PROGRESS INPUT & ENTRY

SUBCONTRACTOR AND RESOURCE MANAGEMENT

1 HOUR CONSTRUCTION SCHEDULE UPDATE

1 HOUR MONTHLY PAYMENT CERTIFICATE

ACTUAL CONSTRUCTION SCHEDULE

4 HOURS PLANNED VS ACTUAL 4D/5D SIMULATION

1 DAY CONSIDERATION OF DATA-DRIVEN PROJECT MANAGEMENT ACTIONS

PROGRESS REPORTS, EVA, KPIs

6X MORE EFFICIENT MONTHLY PAYMENT CERTIFICATION PROCESS USING CHECKED AND APPROVED BIM MODEL

5,6% AVERAGE VALUE REDUCTION OF MONTHLY PAYMENT CERTIFICATES

COST AND QUANTITY EARNED VALUE ANALYSIS KPI, CPI, SPI, CV, SV

INTEGRATION WITH ERP SYSTEMS

83 % LESS CLAIMS & DISPUTES

99% ELIMINATED LOCATION-TIME-WORK CONFLICTS

RICH AND ACCURATE KPI DASHBOARDS FOR TOP MANAGEMENT

ROI

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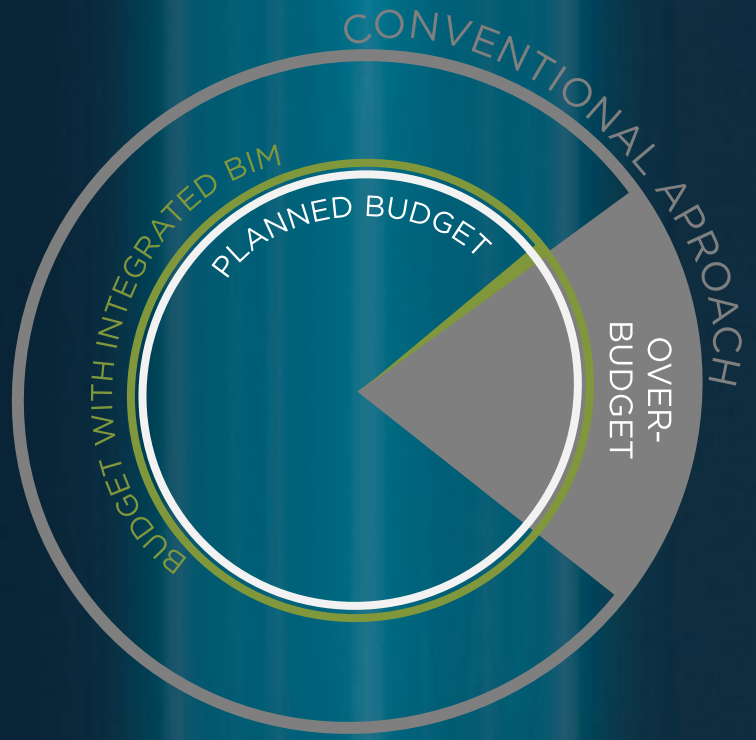

20x MORE EFFICIENT CONSTRUCTION PLANNING

89% REDUCED BUDGET OVERRUNS

25% INCREASED CONSTRUCTION PRODUCTIVITY

4X FASTER CLAIM MANAGEMENT

90% MORE EFFICIENT COST ESTIMATION

95% MORE EFFICIENT DESIGN AND DATA QUALITY CONTROL

The buildingSMART International Virtual Summit Autumn 2021

AMONG THE IMMENSE AMOUNT OF INTERESTING PRESENTATIONS, YOU CAN HEAR US ON:

Tuesday 28th September, 01:40 p.m. BST, Keynote
presented by Veljko Janjic
Innovations and Maturity Levels in openBIM Project Management

Wednesday 29th September, 01:00 p.m. BST, Bexel roundtable discussion
Benefits and Maturity of openBIM Project Management

Thursday 30th September, 10:30 a.m. BST, Construction Room Session 2
presented by Veljko Janjic
IDM/MVD for 4D and 5D and BIM process optimization

Thursday 30th September, 02:00 p.m. BST, Construction Room Session 3
presented by Aleksandar Ilic
Knowledge-driven automated 3D/4D/5D workflows in openBIM environment

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