

Gathering23

Accelerating BIM adoption

CitA

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for the 6th CitA BIM Gathering

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CITA BIM Gathering 2023

IMPLEMENTATION OF DATA MANAGEMENT AND PARAMETRIC 5D PROCEDURES DURING THE CONSTRUCTION STAGE

by Davide Pinchioli

Davide Pinchioli



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Experience

- BIM Manager**
Conack · Full-time
Jul 2023 - Present · 3 mos
Dublin, County Dublin, Ireland
- C+W O'Brien Architects**
4 yrs 7 mos
 - Senior Architectural Designer & BIM Coordinator**
Full-time
Feb 2022 - Jul 2023 · 1 yr 6 mos
Dublin City, County Dublin, Ireland
 - Design Architect**
Jan 2019 - Feb 2022 · 3 yrs 2 mos
Dublin, Leinster, Ireland
- Consulente tecnico**
ELDA S.R.L. · Full-time
Mar 2013 - Dec 2018 · 5 yrs 10 mos
Firenze, Italia
- Collaboratore**
Studio di Architettura Mistretta
Sep 2010 - May 2012 · 1 yr 9 mos
Milano, Italia
- 3AM Studente tirocinante**
3AM architetti associati
Mar 2009 - Jul 2009 · 5 mos
Vimercate

Education

- Scuola Master F.lli Pesenti-Politecnico di Milano**
Master's degree, Project Management in Construction Works with BIM
Nov 2020 - Jul 2022
Grade: 110/110 with Honors
Activities and societies: Project Management in Construction Works with BIM
- Politecnico di Milano**
Laurea triennale in Scienze dell'Architettura e dell'Ingegneria edile, Architettura
2006 - 2010

Davide Pinchioli

BIM Manager

T 061 310002

M 086 4150180

E dpinchioli@conack.ie

W www.conack.ie



Head Office	T 061 310002	Unit C1, Eastway Business Park, Ballysimon Road, Limerick, V94 TD90
Cork	T 021 2428849	12 Eastgate Way, Little Island, Cork, T45 VK60
Dublin	T 01 5241589	Unit 3, The Courtyard, Kilcarbery Business Park, Nangor Road, Dublin 22
Galway	T 091 394192	Unit 7a, Oranmore Business Park, Oranmore, Galway H91 XP3F



CITA BIM Gathering 2023



Implementation of Data Management and Parametric 5D Procedures during Construction Phase

Conack



- One of the biggest Construction Companies in Ireland
- Based in **Limerick** with regional offices in **Cork, Galway & Dublin**
- Company's key activities: **General Building, Main Contractor**
- Over **200 people** directly employed

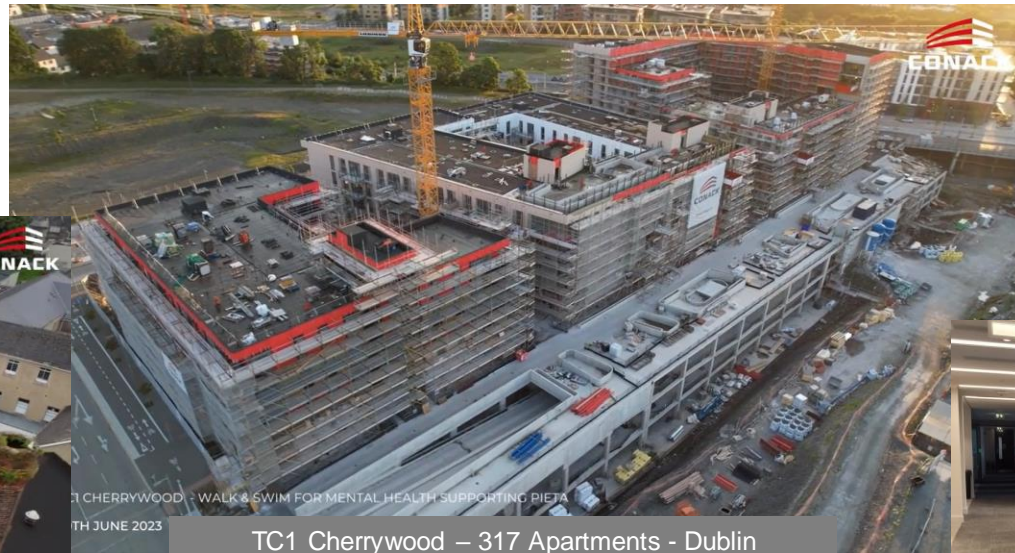
Conack's portfolio extends through:

Healthcare, Retail, Commercial, Industrial,
Civils, Educational, Residential,
Refurbishment & Fitout sectors.

CitA BIM Gathering 2023



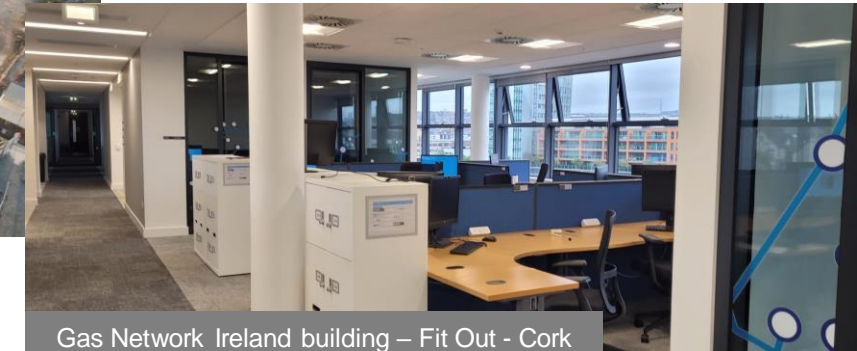
St. Camillus Elderly Care – 75 Bedrooms - Limerick



TC1 Cherrywood – 317 Apartments - Dublin



Nenagh New Hospital Extension – 50 Bedrooms - Nenagh



Gas Network Ireland building – Fit Out - Cork

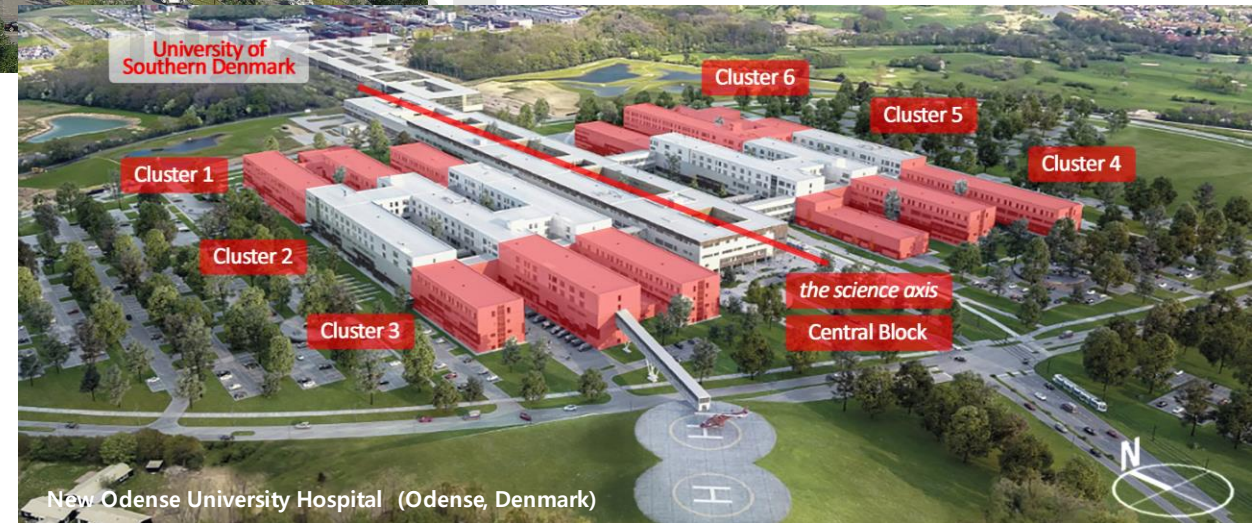
Implementation of Data Management and Parametric 5D Procedures during Construction Phase

New Odense University Hospital, Denmark



The Biggest Denmark's New Hospital

- Site Area: 860.000 m² 86 he
- Total Building Area: 250.000 m²
- Total Number of Rooms: 10.000
- Total Budget: € 700 million



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- Project Scheme: Main Axis Building + 6 "Cluster" Buildings
 - Building Heights: 2 to 5 Storeys

CITA

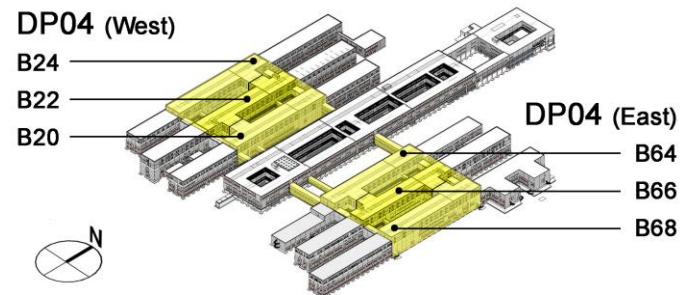
GENERAL CONTRACTOR



- IMPLEMENT 5D COSTING MANAGEMENT PROCESS
- SIMPLIFYING AND STANDARDIZING THE INTERNAL PROCEDURES



BUSINESS PROCESS REENGINEERING



WORK BREAKDOWN STRUCTURE New ODENSE UNIVERSITY HOSPITAL

COSTS

REVENUES

Liv.1		Liv.2		Liv.3		Liv.4		Liv.5		Liv.6		Liv.7	
OUH_WBS Project		OUH_WBS SITE		OUH_WBS BUILDING		OUH_WBS LEVEL FLOOR		OUH_WBS PROJECT CATEGORY		CMB_WBS ZONE (destinazione d'uso)		WBS DESCRIPTION	
OUH	OUH	DP03n	DP03n	B02	Building 02	LUT	Underground Level	EM	Earthmoving	ZA1	Zone A1		
DP100	DP100	DP03s	DP03s	B04	Building 04	FN1	Level Foundations -1	ST	Structure	ZA2	Zone A2		
V01	Variant 1	DP04e	DP04e	B06	Building 06	L-1	Level -1 Basement	FA	Façade	ZA3	Zone A3		
V02	Variant 2	DP04w	DP04w	B10	Building 10	FN0	Level Foundations	WA	Internal partition wall	ZA4	Zone A4		
V03	Variant 3	DP05	DP05	B12	Building 12	L00	Level 00	IS	Isolation and waterproofing	ZA5	Zone A5		
V04	Variant 4	DP06	DP06	B20	Building 20	L01	Level +1	CE	Ceiling Structure	ZB1	Zone B1		
V05	Variant 5	DP07	DP07	B22	Building 22	L02	Level +2	FL	Floors	ZB2	Zone B2		
V08	Variant 8	DP08	DP08	B24	Building 24	L03	Level +3	FI	Finishes	ZB3	Zone B3	FL01	Horizontal stratigraphy
V10	Variant 10			B34	Building 34	L04	Level +4	EI	Electrical	ZB4	Zone B4	FL02	Floor Finish-Concrete
V11	Variant 11			B36	Building 36	LEA	External Area	SP	Special	ZB5	Zone B5	FL03	Floor Finish-Linoleum
V14	Variant 14			B38	Building 38	LRO	Level Roofs	ME	Fluidomechanical	ZB6	Zone B6	FL04	Floor Finish-Tiles
V17	Variant 17			B42	Building 42	LRA	Level Auditorium roof	FF	Firefighting	ZC1	Zone C1	FL05	Floor Finish-Floating
V21	Variant 21			B43	Building 43	L99	All Levels	HD	Hydraulic system	ZC2	Zone C2	FL06	Screed Completion
V22	Variant 22			B44	Building 44	LNO	No Level	EL	Elevator system	ZC3	Zone C3	FL07	Floor Finish-PVC
V23	Variant 23			B45	Building 45			MG	Medical Gases	ZC4	Zone C4		
V24	Variant 24			B50	Building 50			LA	Landscape	Z99	All zone		
V25	Variant 25			B52	Building 52			PW	Prefabricated works	NB: Zone limit: structural Joint			
V26	Variant 26			B54	Building 54			DE	Design	NB: Raw Room (Activity code)			
V27	Variant 27			B64	Building 64			PR	Procurement				
V28	Variant 28			B66	Building 66			MO	Mock-up				
V29	Variant 29			B68	Building 68								
V30	Variant 30			B94	Building 94								
				B96	Building 96								
				B98	Building 98								
				BRD	Bridge								
				BCH	Church								
				BALL	All Building								

Implementation of Data Management and Parametric 5D Procedures during Construction Phase

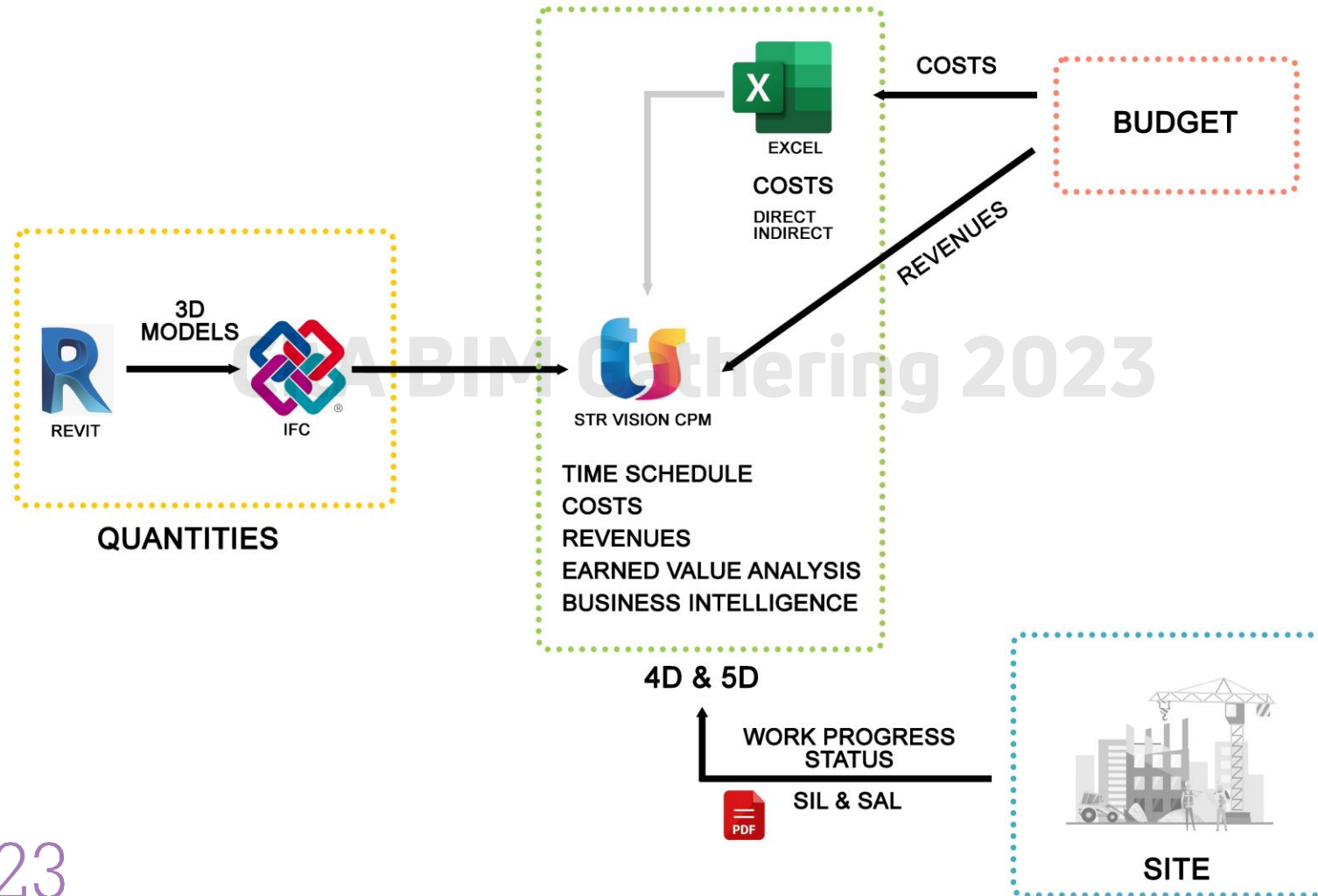
New WBS & CBE

CBS							new	
WBE / COST CODE / CENTRO DI COSTO							CBE	
LOCATION			WBE				MAT CODE	MATERIAL DESCRIPTION
SITE	IN / OUT	WORKING AREA DESCRIPTION	ACTIVITY	ACTIVITY				
4W DP04W	9	Inside building	FL Floors	20	Floor Finishes	C001	OUH_Bitumen modified with Polypropylene (BPP) with Z value Gpasm²/kg=31579 (4mm)	
	0	Outside building		22	Skirting	C002	OUH_Bituminous sheath - Lower	
				21	Horizontal Stratigraphy	C003	OUH_Screed (58mm)	
WBS 5			WBS 7		WBS 8			
WBS PROJECT CATEGORY			WBS DESCRIPTION		WBS TYPES			
FL	Floors	01	Horizontal stratigraphy		T01	Horizontal stratigraphy - S76_Ac_B		
					T02	Horizontal stratigraphy - S61		
					T03	Horizontal stratigraphy - S58_Ac		
					T04	Horizontal stratigraphy - Svar		
					T05	Horizontal stratigraphy - S65_Ac30_B		
					T06	Horizontal stratigraphy - S80_P31579_RC100_XPS500-160		
					T07	Horizontal stratigraphy - S68_Ac30		
					T08	Horizontal stratigraphy - S74_XPS120_B		
					T09	Horizontal stratigraphy - S70_P31579_RC100_XPS500-160		
					T10	Horizontal stratigraphy - S65_Ac_P31579_RC120_XPS500-160		
					T11	Horizontal stratigraphy - S68_P31579_RC120_XPS500-160		

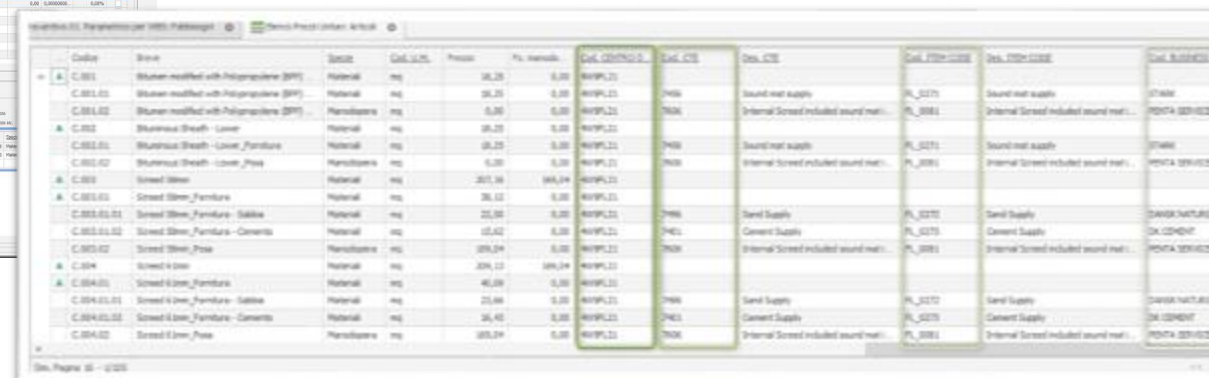
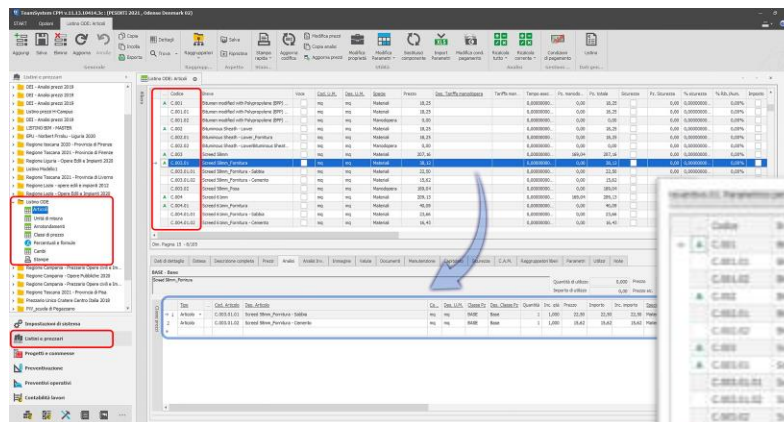
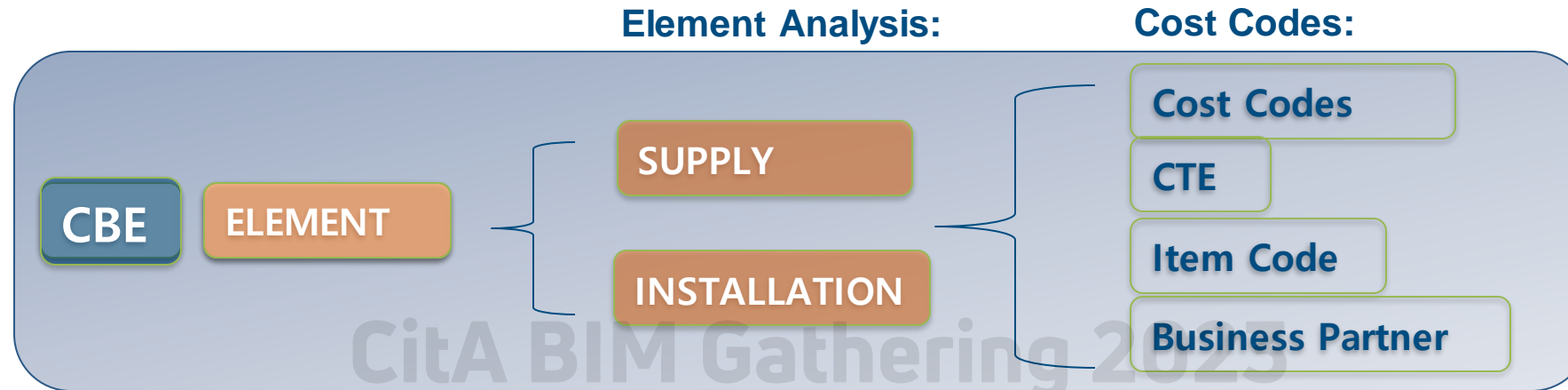
Liv.1	Liv.2	Liv.3	Liv.4	Liv.5	Liv.6	Liv.7
OUH_WBS PROJECT	OUH_WBS SITE	OUH_WBS BUILDING	OUH_WBS ZONE	OUH_WBS PROJECT CATEGORY	CBS_WBS_ZONE (destinazione d'uso)	WBS DESCRIPTION
C001	DP04W	001	Building 01	001	001	Zone A1
DP04W	DP04W	004	Building 04	001	001	Zone A2
DP04W	DP04W	006	Building 06	001	001	Zone A3
DP04W	DP04W	010	Building 10	001	001	Zone A4
DP04W	DP04W	012	Building 12	001	001	Zone A5
DP04W	DP04W	020	Building 20	001	001	Zone B1
DP04W	DP04W	022	Building 22	001	001	Zone B2
DP04W	DP04W	024	Building 24	001	001	Zone B3
DP04W	DP04W	026	Building 26	001	001	Zone B4
DP04W	DP04W	028	Building 28	001	001	Zone B5
DP04W	DP04W	030	Building 30	001	001	Zone B6
DP04W	DP04W	032	Building 32	001	001	Zone B7
DP04W	DP04W	034	Building 34	001	001	Zone B8
DP04W	DP04W	036	Building 36	001	001	Zone B9
DP04W	DP04W	038	Building 38	001	001	Zone B10
DP04W	DP04W	040	Building 40	001	001	Zone B11
DP04W	DP04W	042	Building 42	001	001	Zone B12
DP04W	DP04W	044	Building 44	001	001	Zone B13
DP04W	DP04W	046	Building 46	001	001	Zone B14
DP04W	DP04W	048	Building 48	001	001	Zone B15
DP04W	DP04W	050	Building 50	001	001	Zone B16
DP04W	DP04W	052	Building 52	001	001	Zone B17
DP04W	DP04W	054	Building 54	001	001	Zone B18
DP04W	DP04W	056	Building 56	001	001	Zone B19
DP04W	DP04W	058	Building 58	001	001	Zone B20
DP04W	DP04W	060	Building 60	001	001	Zone B21
DP04W	DP04W	062	Building 62	001	001	Zone B22
DP04W	DP04W	064	Building 64	001	001	Zone B23
DP04W	DP04W	066	Building 66	001	001	Zone B24
DP04W	DP04W	068	Building 68	001	001	Zone B25
DP04W	DP04W	070	Building 70	001	001	Zone B26
DP04W	DP04W	072	Building 72	001	001	Zone B27
DP04W	DP04W	074	Building 74	001	001	Zone B28
DP04W	DP04W	076	Building 76	001	001	Zone B29
DP04W	DP04W	078	Building 78	001	001	Zone B30
DP04W	DP04W	080	Building 80	001	001	Zone B31
DP04W	DP04W	082	Building 82	001	001	Zone B32
DP04W	DP04W	084	Building 84	001	001	Zone B33
DP04W	DP04W	086	Building 86	001	001	Zone B34
DP04W	DP04W	088	Building 88	001	001	Zone B35
DP04W	DP04W	090	Building 90	001	001	Zone B36
DP04W	DP04W	092	Building 92	001	001	Zone B37
DP04W	DP04W	094	Building 94	001	001	Zone B38
DP04W	DP04W	096	Building 96	001	001	Zone B39
DP04W	DP04W	098	Building 98	001	001	Zone B40
DP04W	DP04W	100	Building 100	001	001	Zone B41
DP04W	DP04W	102	Building 102	001	001	Zone B42
DP04W	DP04W	104	Building 104	001	001	Zone B43
DP04W	DP04W	106	Building 106	001	001	Zone B44
DP04W	DP04W	108	Building 108	001	001	Zone B45
DP04W	DP04W	110	Building 110	001	001	Zone B46
DP04W	DP04W	112	Building 112	001	001	Zone B47
DP04W	DP04W	114	Building 114	001	001	Zone B48
DP04W	DP04W	116	Building 116	001	001	Zone B49
DP04W	DP04W	118	Building 118	001	001	Zone B50
DP04W	DP04W	120	Building 120	001	001	Zone B51

Implementation of Data Management and Parametric 5D Procedures during Construction Phase

TO BE

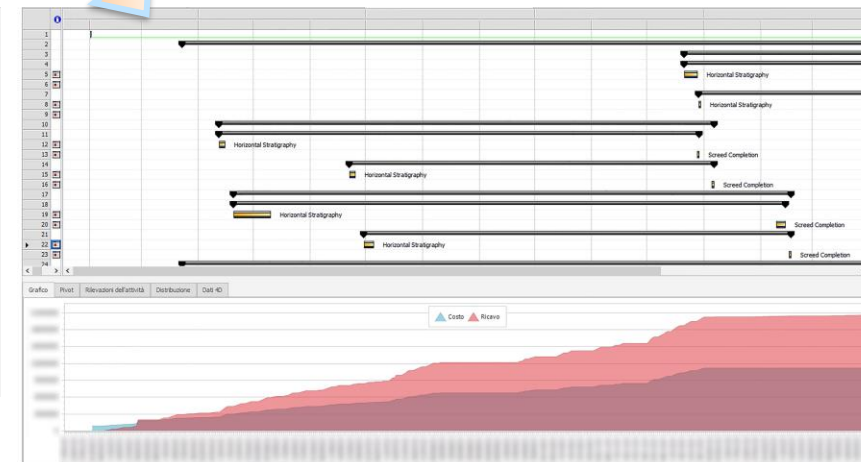
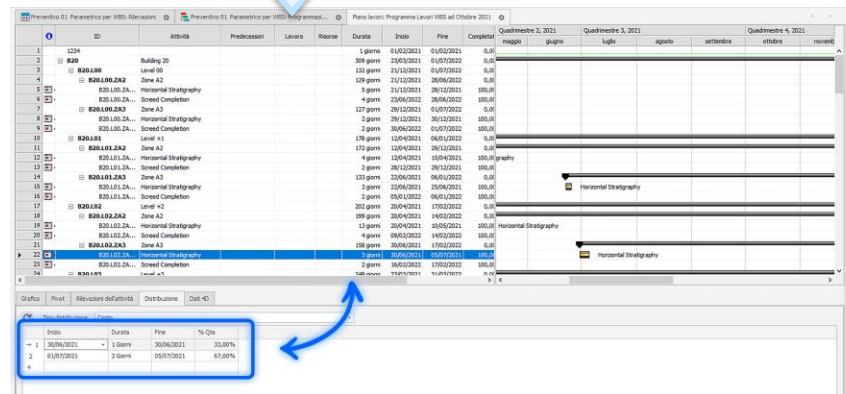
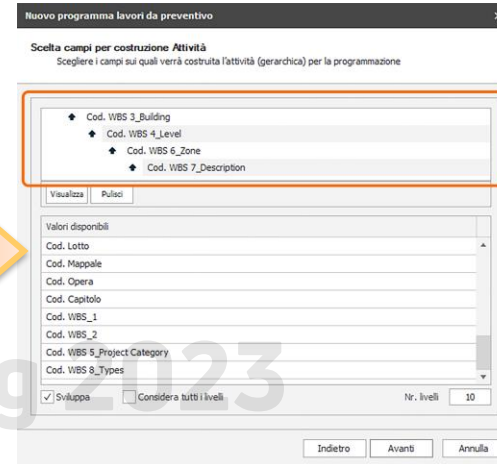


Creating price Lists in the software



TIME SCHEDULING BASELINE 4D

- Parametric Estimation linked to the baseline
- Organized by WBS
- Costs and Revenues distribution



... SITE MONITORING

CREATION OF RILEVAZIONI SIL



- From Rilevazioni of Parametric Estimation
- Organized by WBS
- % Site Progressing per unit time

Numero	Descrizione	Data	Corrente
1	Stato interno la...	26/02/2021	
2	Stato interno la...	31/03/2021	
3	Stato interno la...	30/04/2021	
4	Stato interno la...	31/05/2021	
5	Stato interno la...	30/06/2021	
6	Stato interno la...	30/07/2021	
7	Stato interno la...	31/08/2021	
8	Stato interno la...	30/09/2021	
9	Stato interno la...	29/10/2021	
10	Stato interno la...	30/11/2021	
11	Stato interno la...	28/02/2022	
12	Stato interno la...	31/03/2022	

Date	Description	Unità	Quantità	Importo	% S.A.L.	% S.A. Corrente	% Progressiva	% Realizza
30/04/2021	Stato interno la...	C.006	1	10000	100%	100%	100%	100%

% S.A. Preco.	% S.A. Corrente	% Progressiva	% Realizza
100%	100%	100%	100%

% S.A. Preco.	% S.A. Corrente	% Progressiva	% Realizza
100%	100%	100%	100%



... FROM THE SITE

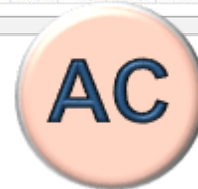
DELIVERY NOTES TIME SHEET
 REPORTS WORK PROGRESS STATUS
 Cost Codes

Quantity Surveyor & Cost Controller

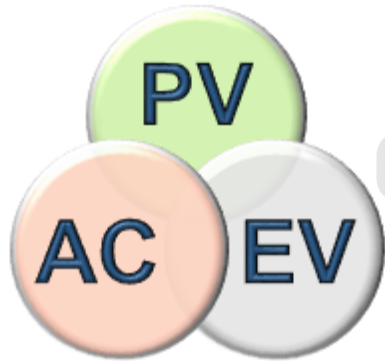
SAL ATTIVI SIL PASSIVI

CITA BIM Gathering 2023 COSTS AND REVENUES REFLECTING FROM THE SITE

Cod. Doc.	Cod. Cate.	Data doc.	Num.	Data compe...	Articolo	Descr	Cod...	Quantità	Pz. Lordo	Importo	Des. Doc.	Cod. CENTRI DI COSTO	Cod. CTE	Cod. ITEM CODE	Des. ITEM CODE	Cod. BUSINESS
0026C	Ccos	31/08/2021	026	31/08/2021	M04	Sand Supply	TN	256,00	152,00	38.912,00	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0027C	Ccos	30/09/2021	027	30/09/2021	M04	Sand Supply	TN	194,00	129,00	25.026,00	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0028C	Ccos	29/10/2021	028	29/10/2021	M04	Sand Supply	TN	369,00	129,70	47.859,30	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0029C	Ccos	30/11/2021	029	30/11/2021	M04	Sand Supply	TN	201,88	130,00	26.244,40	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0030C	Ccos	31/12/2021	030	31/12/2021	M04	Sand Supply	TN	135,00	130,00	17.550,00	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0031C	Ccos	28/02/2022	031	28/02/2022	M04	Sand Supply	TN	310,00	133,00	41.230,00	Costo sand	4V9PL21	7496	FL_0272	Sand Supply	DANSK NATURS...
0032C	Ccos	30/04/2021	032	30/04/2021	M05	Cement Supply	TN	83,00	722,97	60.006,51	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0033C	Ccos	31/05/2021	033	31/05/2021	M05	Cement Supply	TN	75,00	748,00	56.100,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0034C	Ccos	30/06/2021	034	30/06/2021	M05	Cement Supply	TN	45,00	704,00	31.680,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0035C	Ccos	30/07/2021	035	30/07/2021	M05	Cement Supply	TN	122,00	710,00	86.620,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0036C	Ccos	31/08/2021	036	31/08/2021	M05	Cement Supply	TN	34,00	681,00	23.154,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0037C	Ccos	30/09/2021	037	30/09/2021	M05	Cement Supply	TN	26,00	681,00	17.756,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0038C	Ccos	29/10/2021	038	29/10/2021	M05	Cement Supply	TN	49,00	705,96	38.267,04	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0039C	Ccos	30/11/2021	039	30/11/2021	M05	Cement Supply	TN	26,92	862,00	23.205,04	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0040C	Ccos	31/12/2021	040	31/12/2021	M05	Cement Supply	TN	38,00	781,00	14.058,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0041C	Ccos	28/02/2022	041	28/02/2022	M05	Cement Supply	TN	41,00	946,00	38.786,00	Costo cement	4V9PL21	7401	FL_0273	Cement Supply	DK CEMENT
0042C	Ccos	30/04/2021	042	30/04/2021	M06	Concrete Grinding (smoothing of the sl...	mq	1.320,000	160,00	211.200,00	Costo concrete gri...	4V9PL21	7606_1	FL_0274	Concrete grinding (Smoothing of the Sl...	SCANBOND
0043C	Ccos	31/05/2021	043	31/05/2021	M06	Concrete Grinding (smoothing of the sl...	mq	360,000	160,00	57.600,00	Costo concrete gri...	4V9PL21	7606_1	FL_0274	Concrete grinding (Smoothing of the Sl...	SCANBOND
0044C	Ccos	30/06/2021	044	30/06/2021	M06	Concrete Grinding (smoothing of the sl...	mq	2.172,000	160,00	347.520,00	Costo concrete gri...	4V9PL21	7606_1	FL_0274	Concrete grinding (Smoothing of the Sl...	SCANBOND
0045C	Ccos	30/07/2021	045	30/07/2021	M06	Concrete Grinding (smoothing of the sl...	mq	1.315,000	160,00	210.400,00	Costo concrete gri...	4V9PL21	7606_1	FL_0274	Concrete grinding (Smoothing of the Sl...	SCANBOND



« The realized cost incurred for the work performed on an activity during a specific time period. In other words, the cost you incur while accomplishing the work for which EV is measured. »

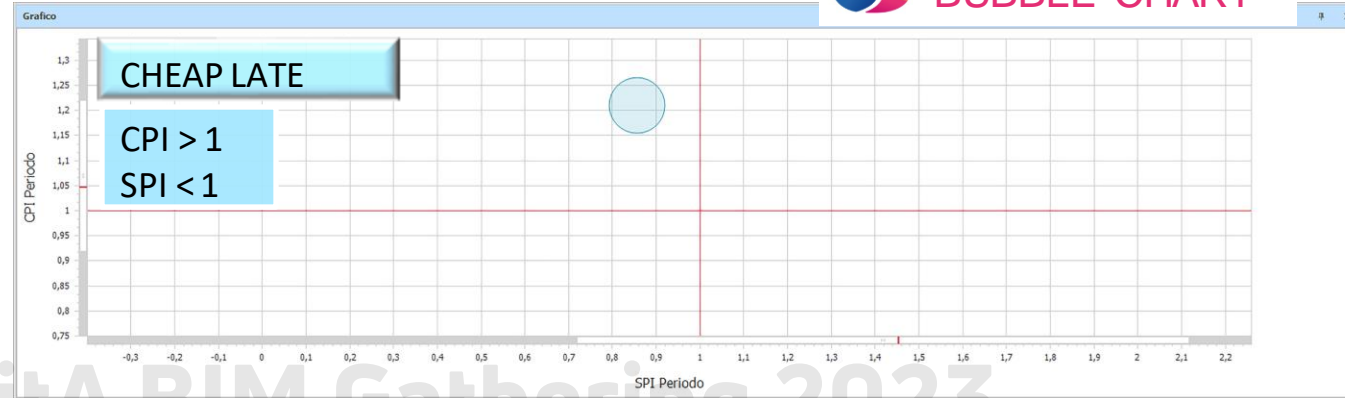


SCHEDULE PERFORMANCE INDEX
COST PERFORMANCE INDEX

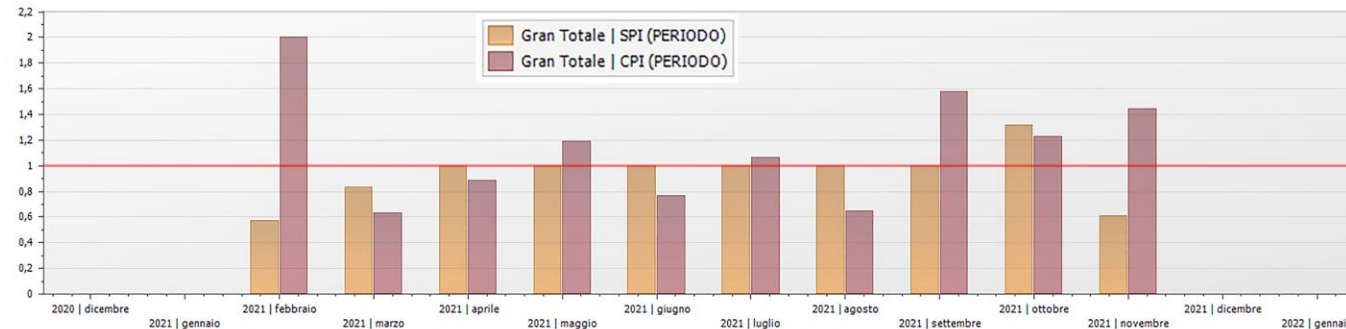
$$SPI = EV / PV$$

$$CPI = EV / AC$$

BUBBLE CHART



BAR CHART



SPI < 1 → Late

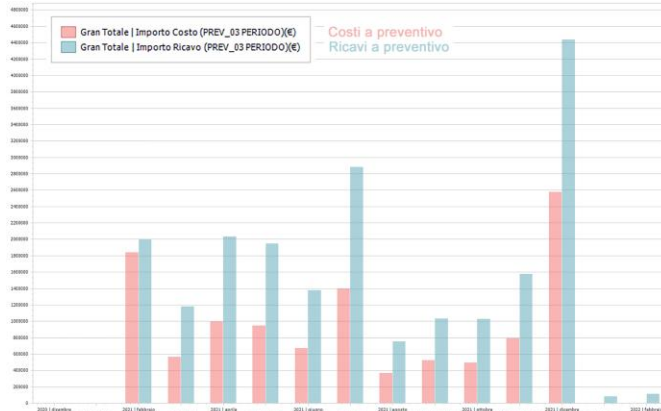
SPI > 1 → In advance

CPI < 1 → Expensive

CPI > 1 → Cheap

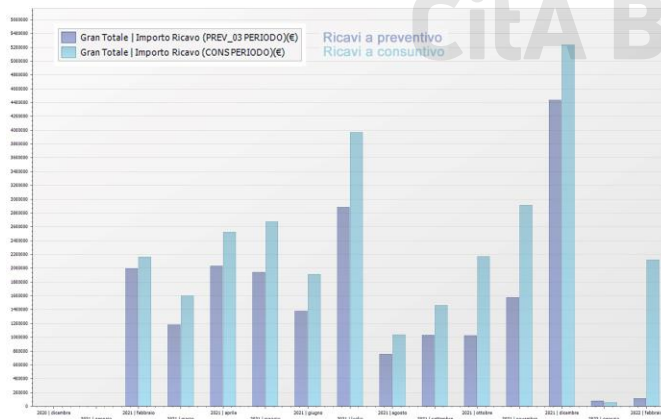
Implementation of Data Management and Parametric 5D Procedures during Construction Phase

Dashboards from CPM

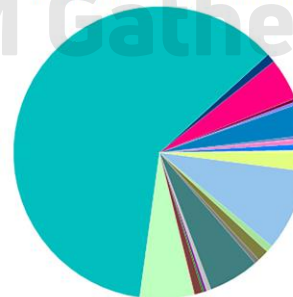


Gran Totale			
Cod. W...	Quantità	Imp. lordo (Base)(€)	Incidenza Importi Lavori
T01	121,77	26.346,59	0,29
T02	344,83	72.113,46	0,80
T03	254,63	52.749,36	0,58
T04	17,26	4.460,50	0,05
T05	1.717,61	363.720,02	4,03
T06	2.115,71	484.625,45	5,37
T07	29.866,00	6.383.259,12	70,67
T08	431,89	94.012,73	1,04
T09	104,85	22.547,56	0,25
T10	2.767,63	586.072,48	6,49
T11	4.409,59	942.461,66	10,43
Gran Totale	42.151,75	9.032.368,93	100,00

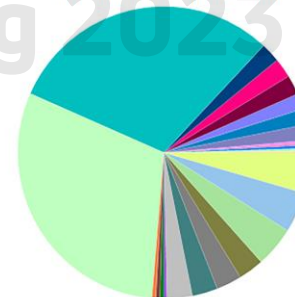
Grafico	
Incidenza Importi Lavori	Incidenza Quantità
T01	0,289
T02	0,818
T03	0,604
T04	0,041
T05	4,075
T06	5,019
T07	70,854
T08	1,025
T09	0,249
T10	6,566
T11	10,461
Gran Totale	100,000



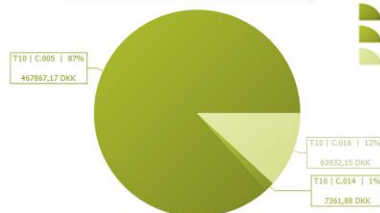
Gran Totale | Incidenza Importi Lavori



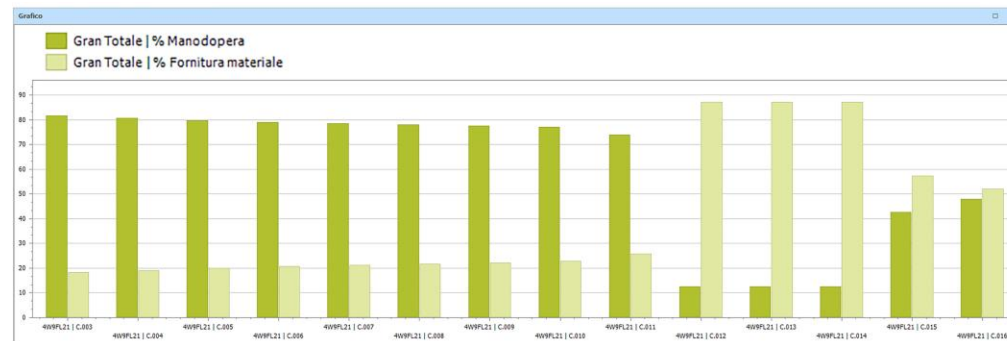
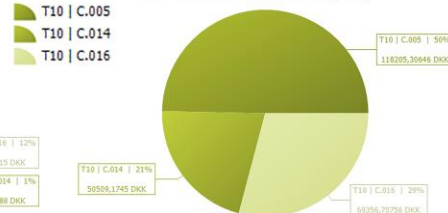
Gran Totale | Incidenza Quantità



Gran Totale | Imp. manodopera (Base)

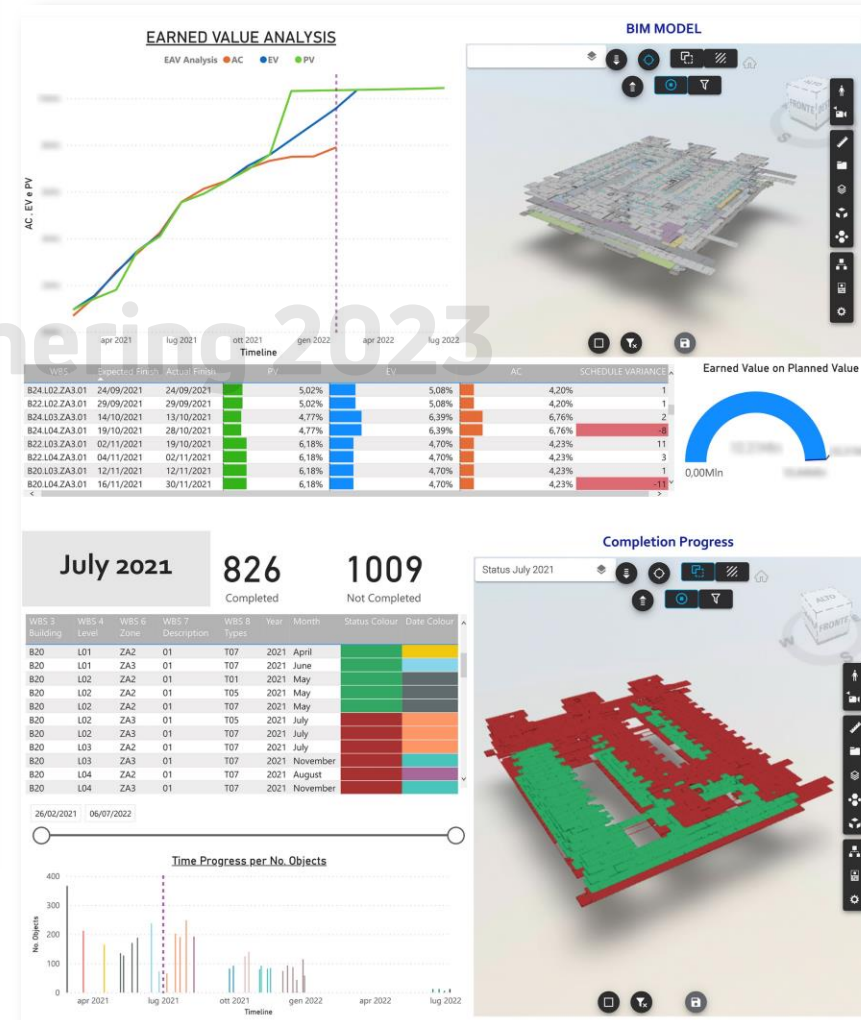
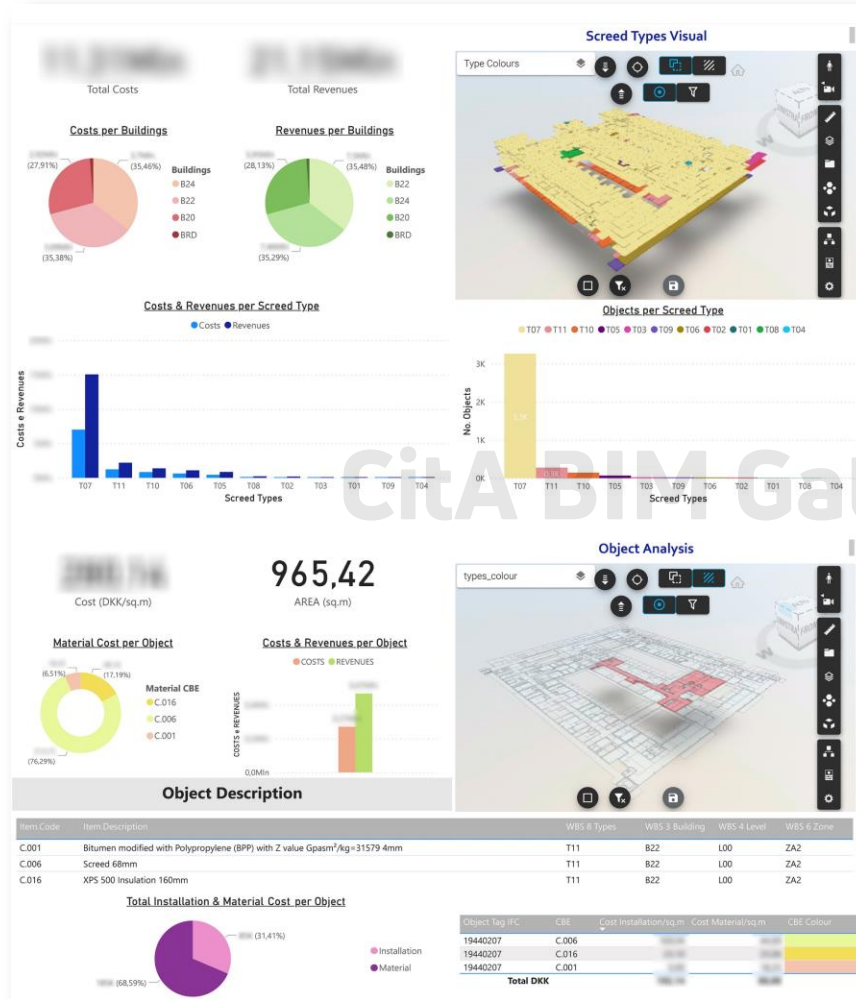


Gran Totale | Imp. Materiale (Base)



Implementation of Data Management and Parametric 5D Procedures during Construction Phase

VCAD / Power BI



Gathering23

Accelerating BIM adoption

CITA



THANK YOU