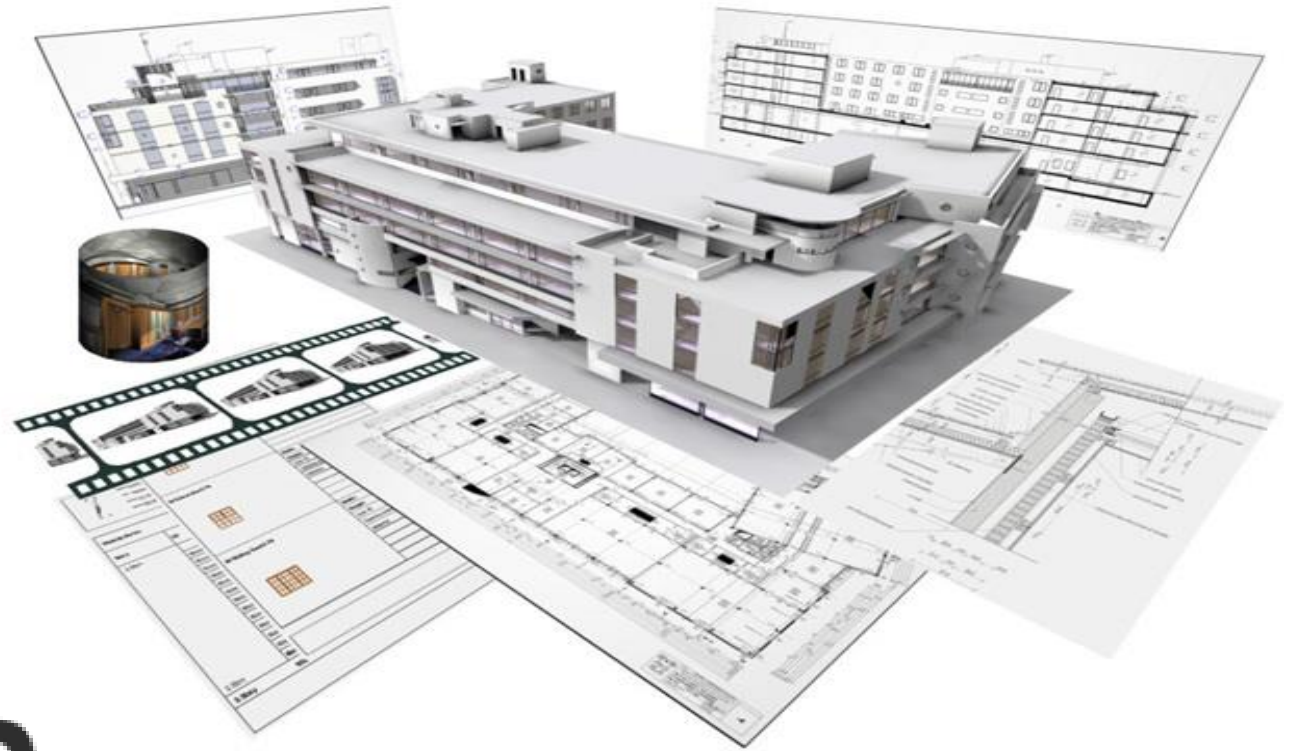


# FACILITY MANAGEMENT 2014

MÁJ 2014, BRATISLAVA



[MÁ SKUTOČNE BIM VÝZNAM PRE OBLASŤ FM?]

2014

ING. TOMÁŠ FUNTÍK

4. For public works contracts and design contests, Member States may require the use of specific electronic tools, such as of building information electronic modelling tools or similar. In such cases the contracting authorities shall offer alternative means of access, as provided for in paragraph 5, until such time as those tools become generally available within the meaning of the second sentence of the first subparagraph of paragraph 1.

## DIREKTÍVA EURÓPSKEJ ÚNIE

FEBRUÁR 2014

### CEN/BT/WG 215

**Building Information Modelling (BIM)**

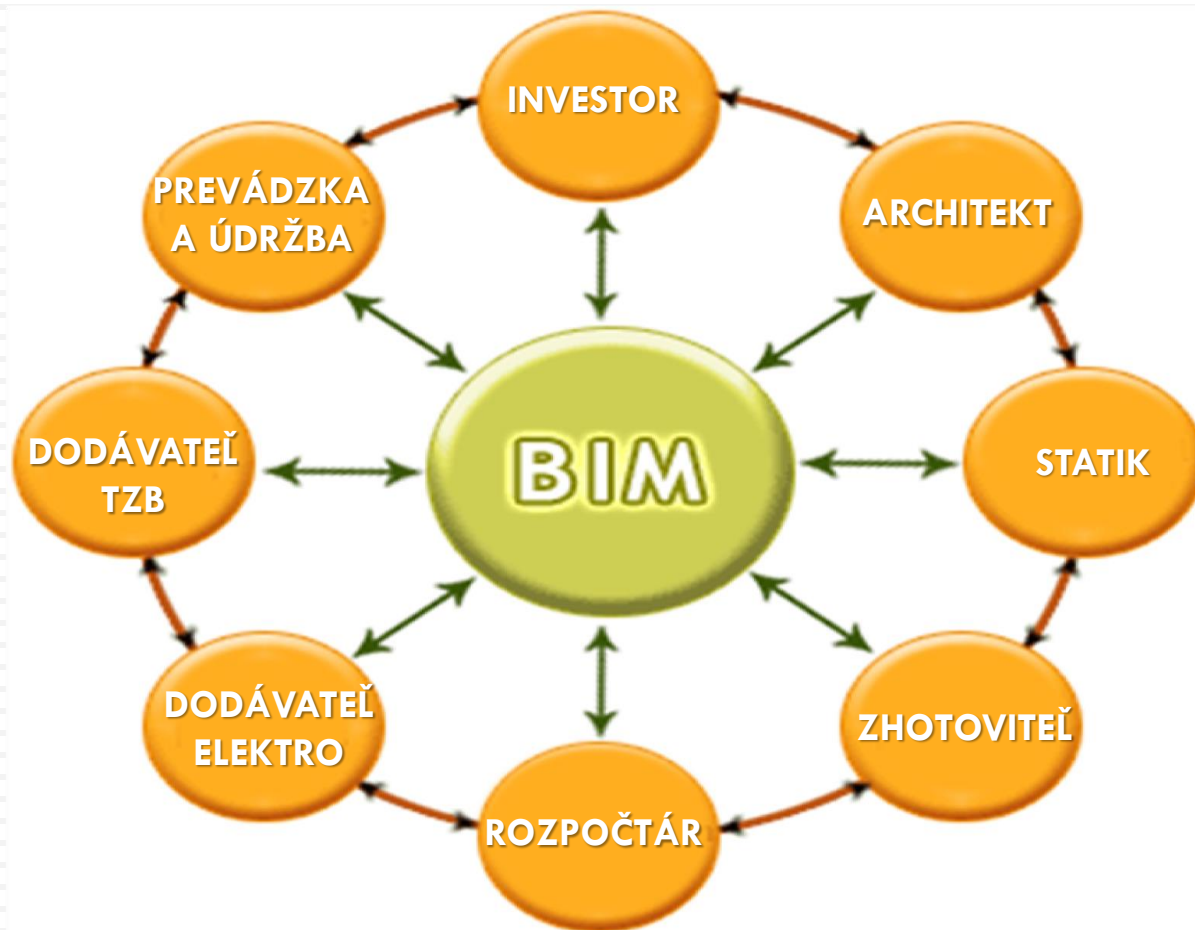
ŠTANDARDIZÁCIA

*„Informačný model budovy je digitálnou reprezentáciou fyzických a funkčných vlastností budovy. Proces výstavby a správu budov zahŕňa mnoho zúčastnených strán, a preto je veľmi dôležité správne zdieľanie informácií po celú dobu životného cyklu budovy; definované ako existujúce od prvotnej koncepcie po asanáciu.” buildingSMART alliance*

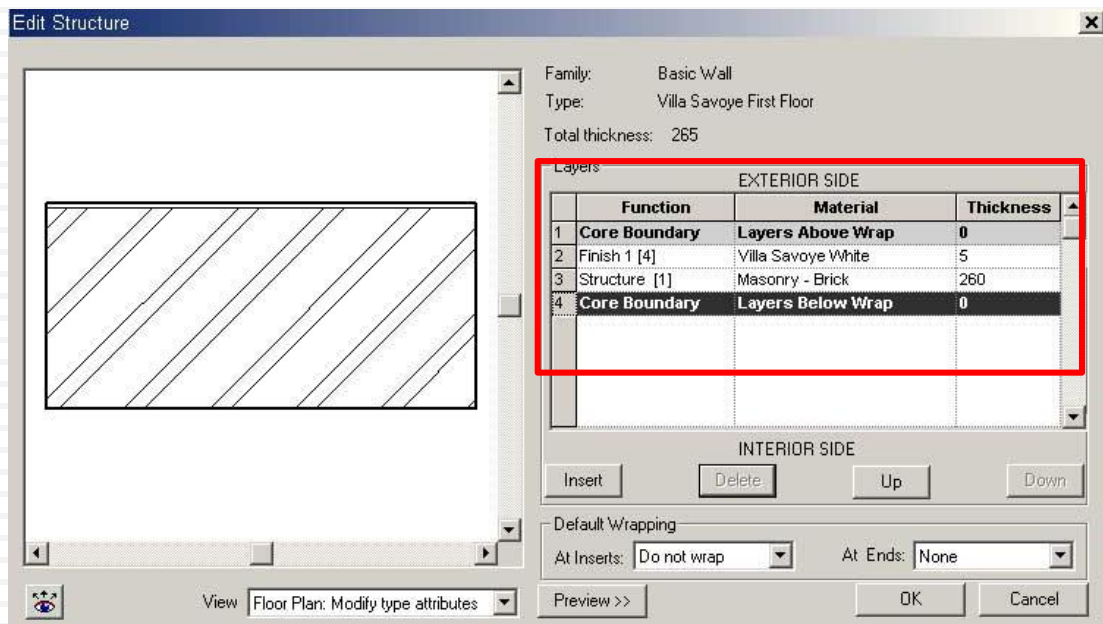
*„Akékoľvek súbory informácií o budove, v akejkolvek forme, predstavujú informačný model budovy (Building information model). Akákoľvek simulácia, akejkolvek skutočnej aktivity vo vzťahu k budove je aktom informačného modelovania budovy (Building information modeling).“ D. Smith, & M. Tardif*

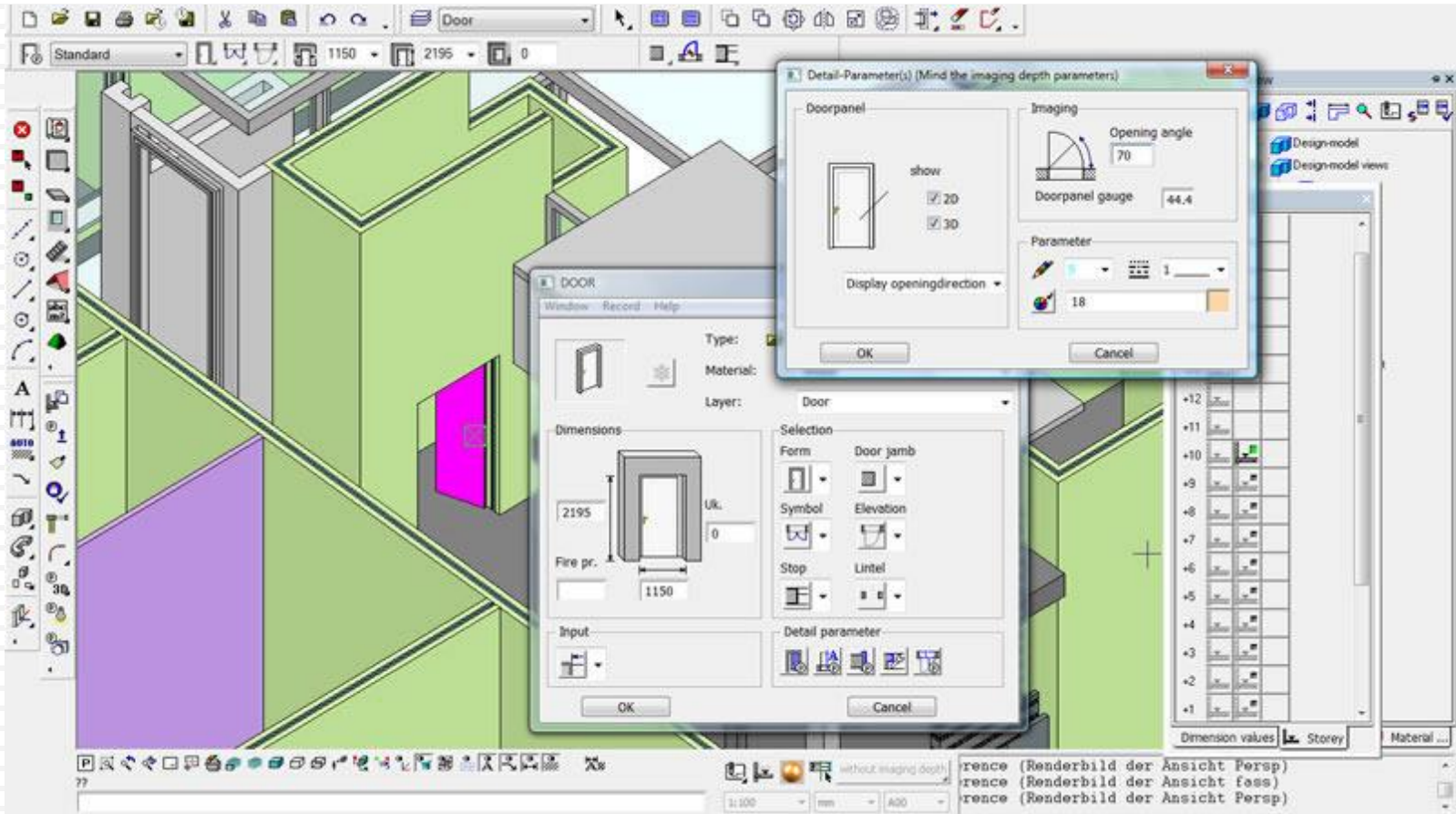
*“If a picture is worth a thousand words, a model is worth millions”*

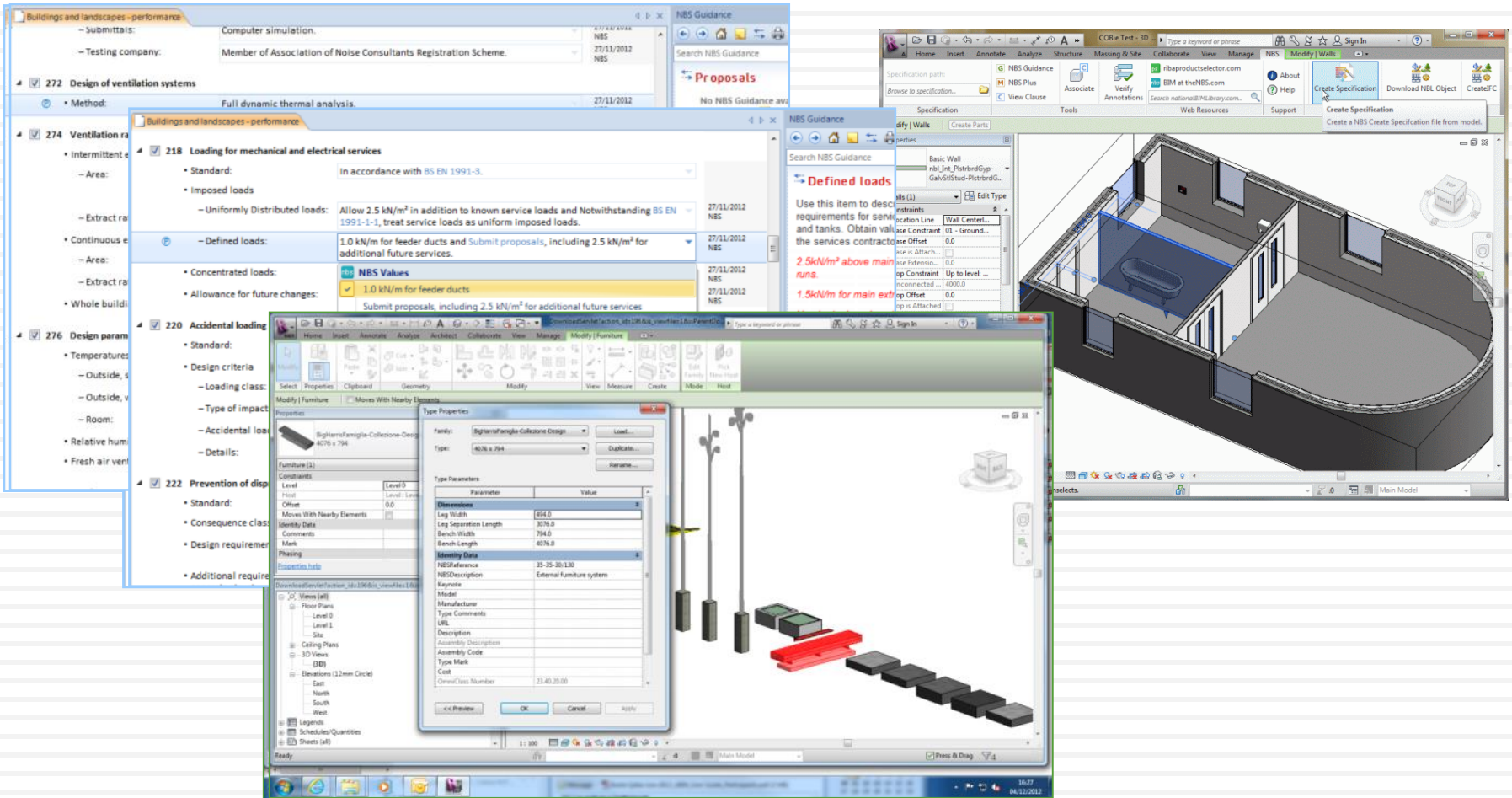
*Jim Bratton*











**Buildings and landscapes - performance**

- 272 Design of ventilation systems
  - Method: Full dynamic thermal analysis.
- 274 Ventilation requirements
  - 218 Loading for mechanical and electrical services
    - Standard: In accordance with BS EN 1991-3.
    - Imposed loads
      - Uniformly Distributed loads: Allow  $2.5 \text{ kN/m}^2$  in addition to known service loads and Notwithstanding BS EN 1991-1-1, treat service loads as uniform imposed loads.
      - Defined loads:  $1.0 \text{ kN/m}^2$  for feeder ducts and Submit proposals, including  $2.5 \text{ kN/m}^2$  for additional future services.
    - Concentrated loads: NBS Values
      - Allowance for future changes:  $1.0 \text{ kN/m}^2$  for feeder ducts
      - Submit proposals, including  $2.5 \text{ kN/m}^2$  for additional future services
- 220 Accidental loading
  - Standard: BS EN 1991-3
  - Design criteria
    - Loading class: 1
    - Type of impact: 1
    - Accidental load: 1
  - Details: 1
- 222 Prevention of displacement
  - Standard: BS EN 1991-3
  - Consequence class: 1
  - Design requirements: 1
  - Additional requirements: 1

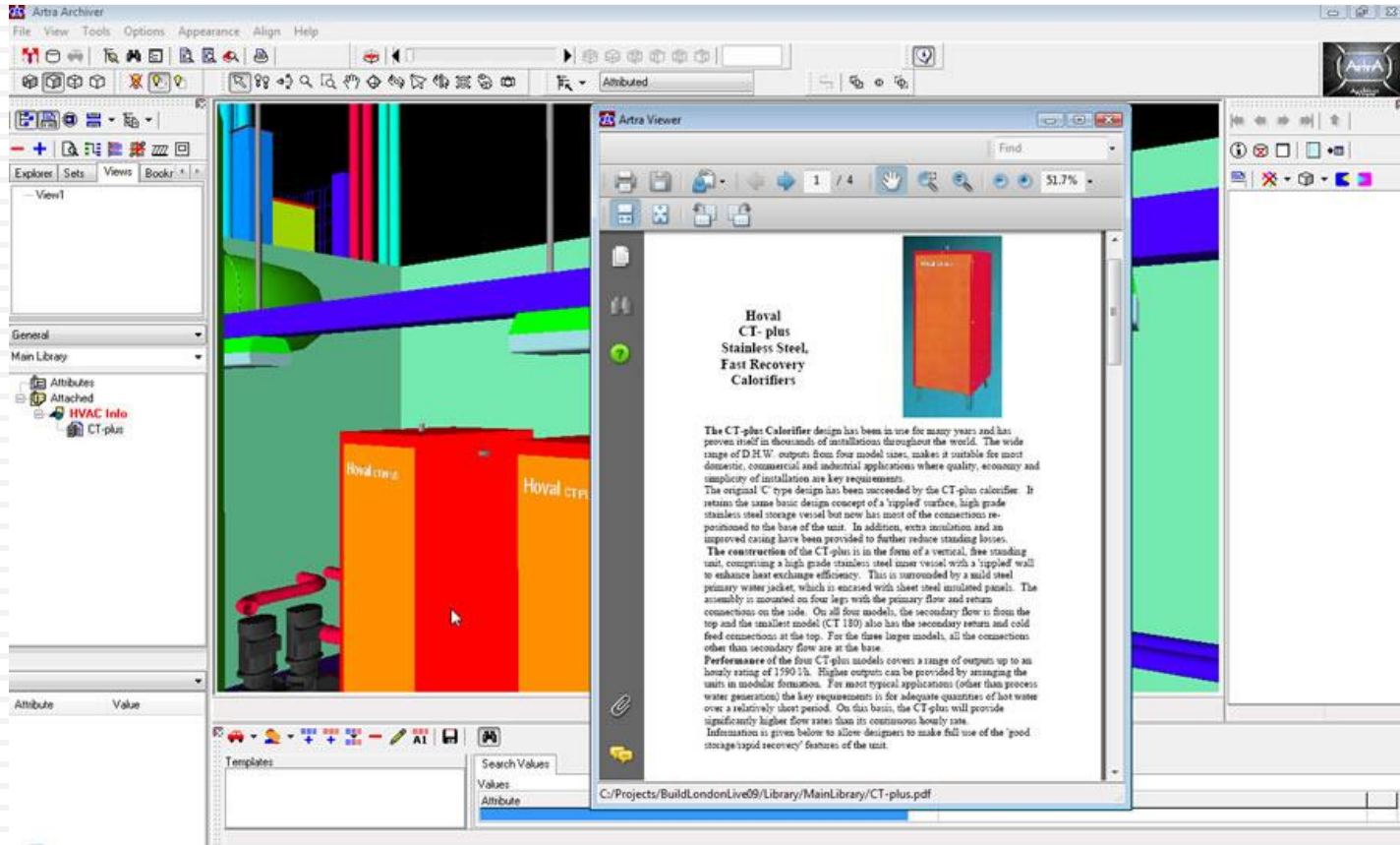
**Defined loads**

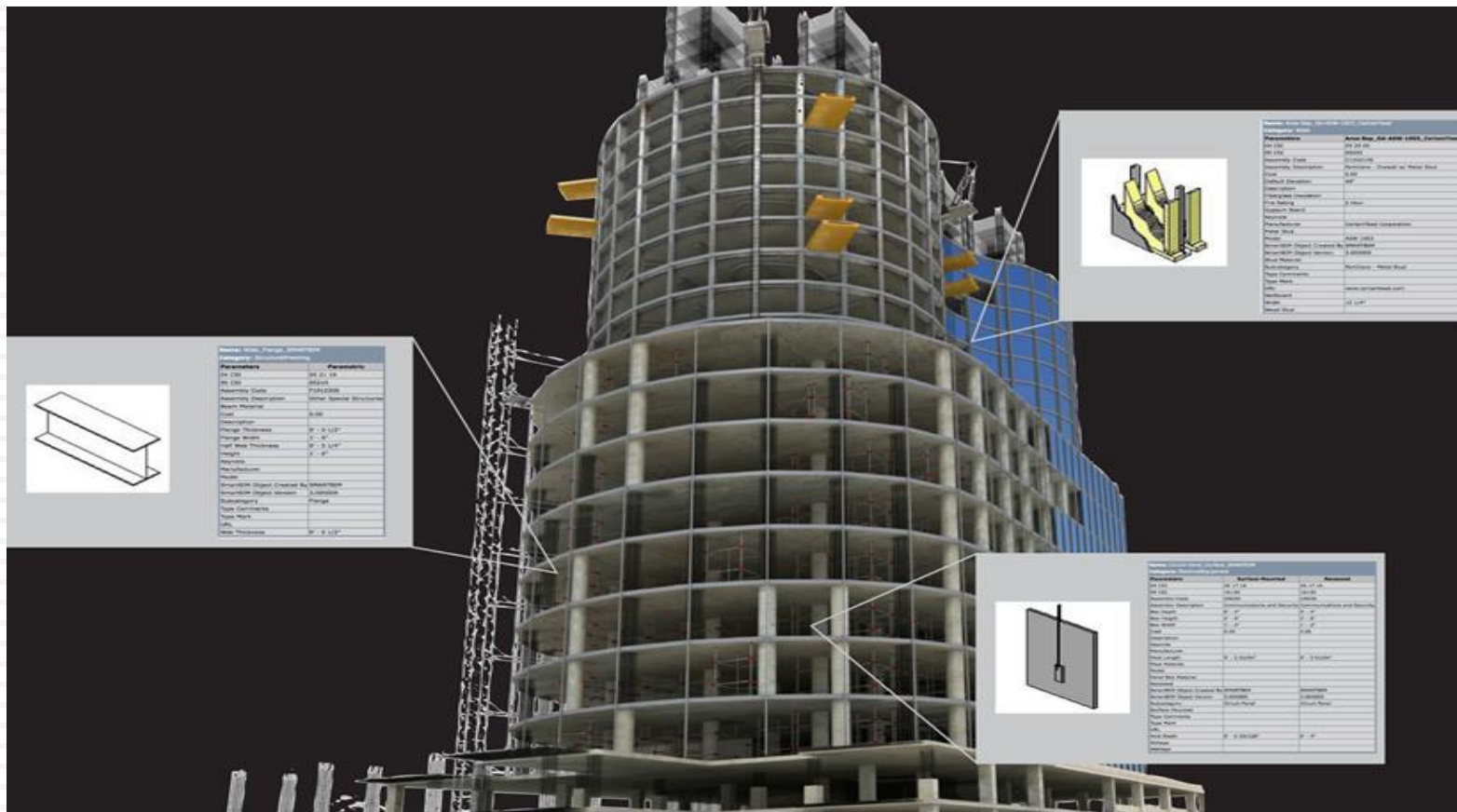
- Use this item to describe requirements for service ducts and tanks. Obtain values from the services contractor.
- $2.5 \text{ kN/m}^2$  above main runs
- $1.5 \text{ kN/m}^2$  for main extension

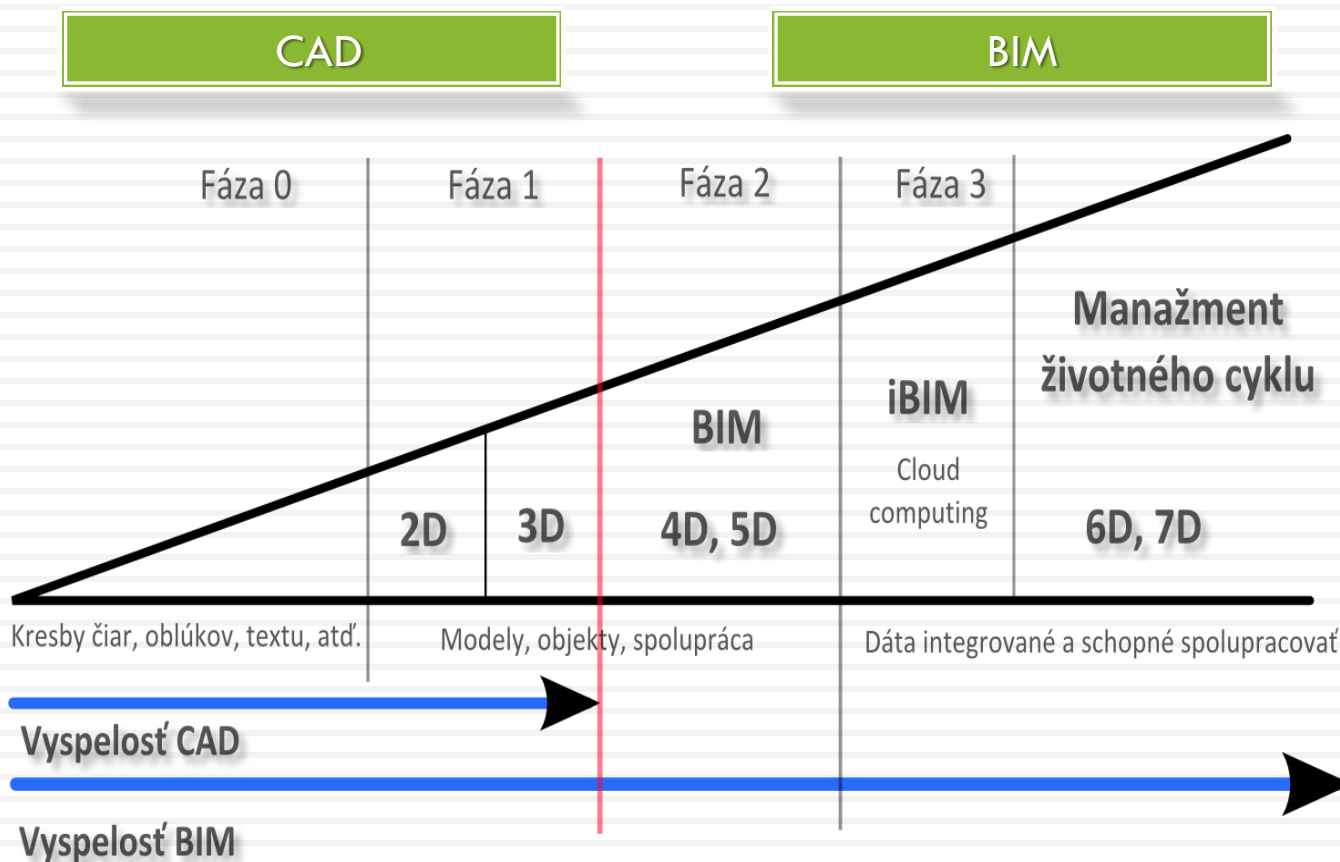
**Type Properties**

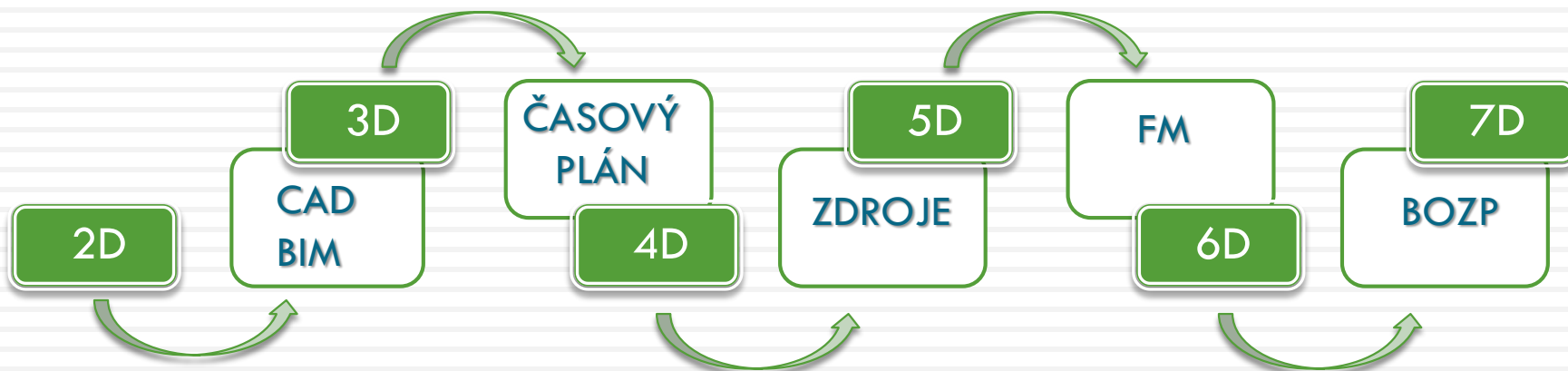
Parameter	Value
Leg Width	204.0
Leg Separation Length	3076.0
Bench Width	794.0
Bench Length	4076.0
NBS Reference	11-25-30-120
NBS Description	External furniture system
Manufacturer	
Type Comments	
URL	
Description	
Assembly Description	
Assembly Code	
Type Mark	
Cost	
Overclass Number	23.40.20.00











## SKENOVANIE DOKUMENTÁCIE

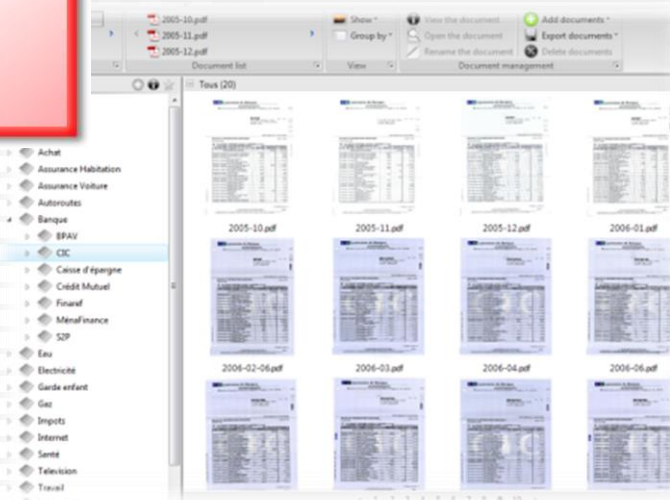


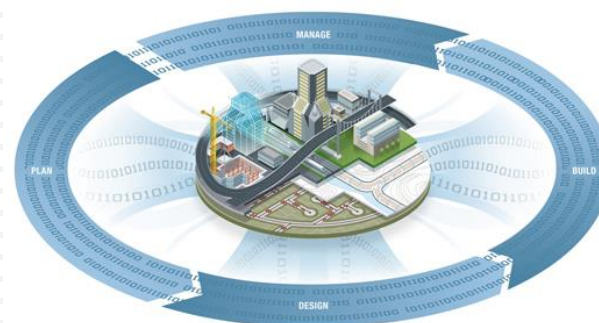
ELEKTRONICKÝ SÚBOR

PROJEKTOVÁ DOKUMENTÁCIA



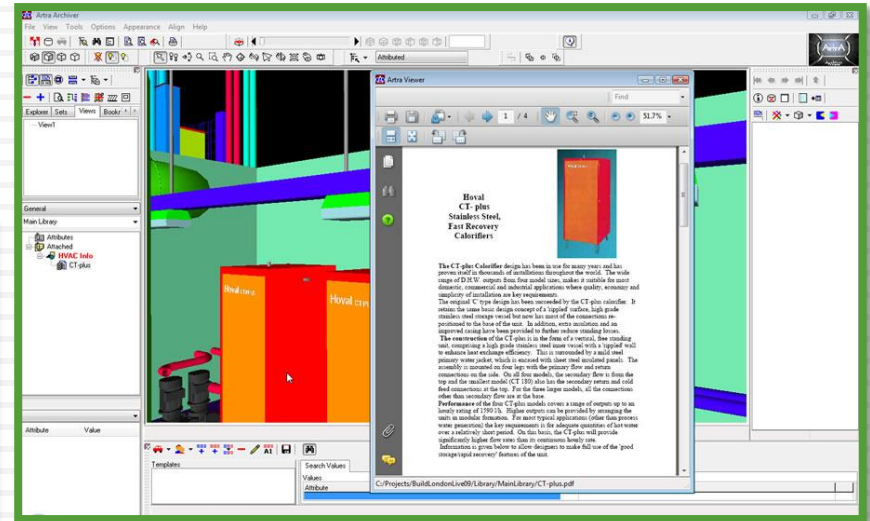
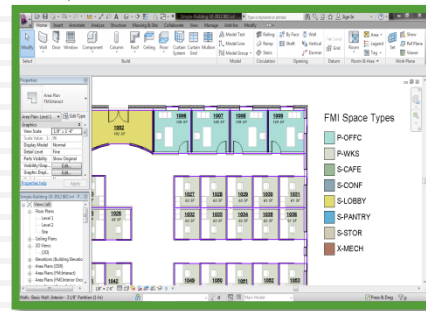
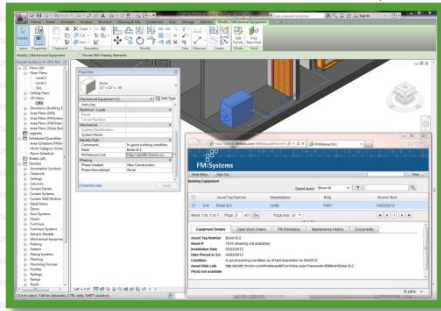
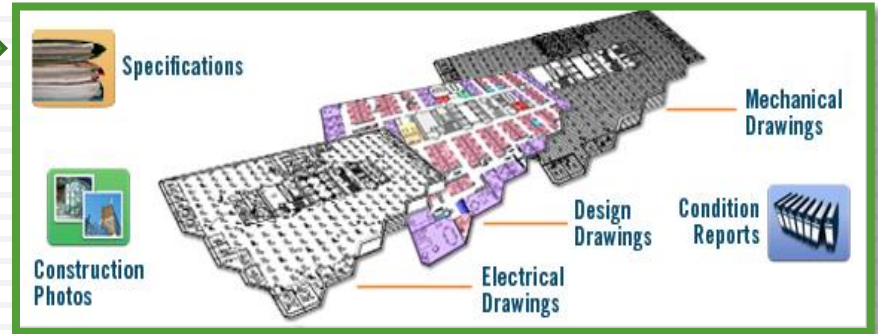
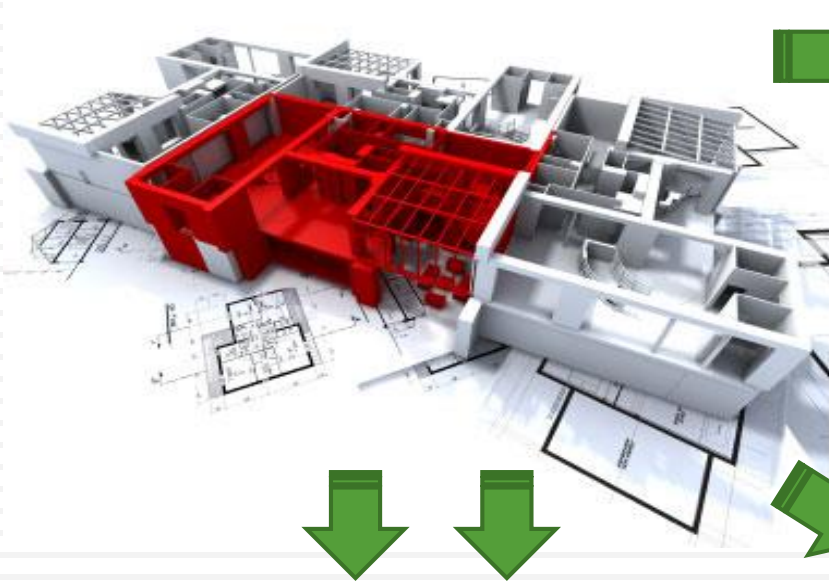
DOKUMENTOVÝ SERVER





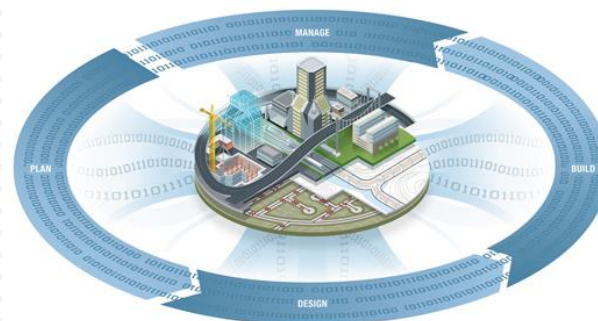
*RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ*

1



RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1



ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2



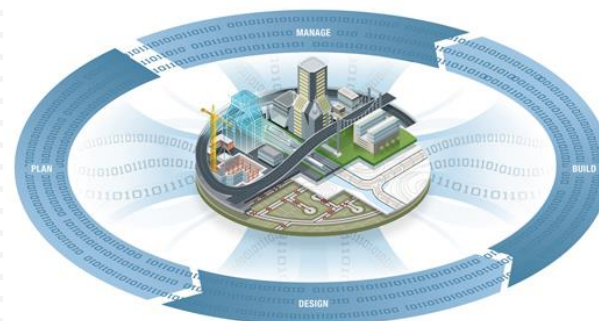


RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1

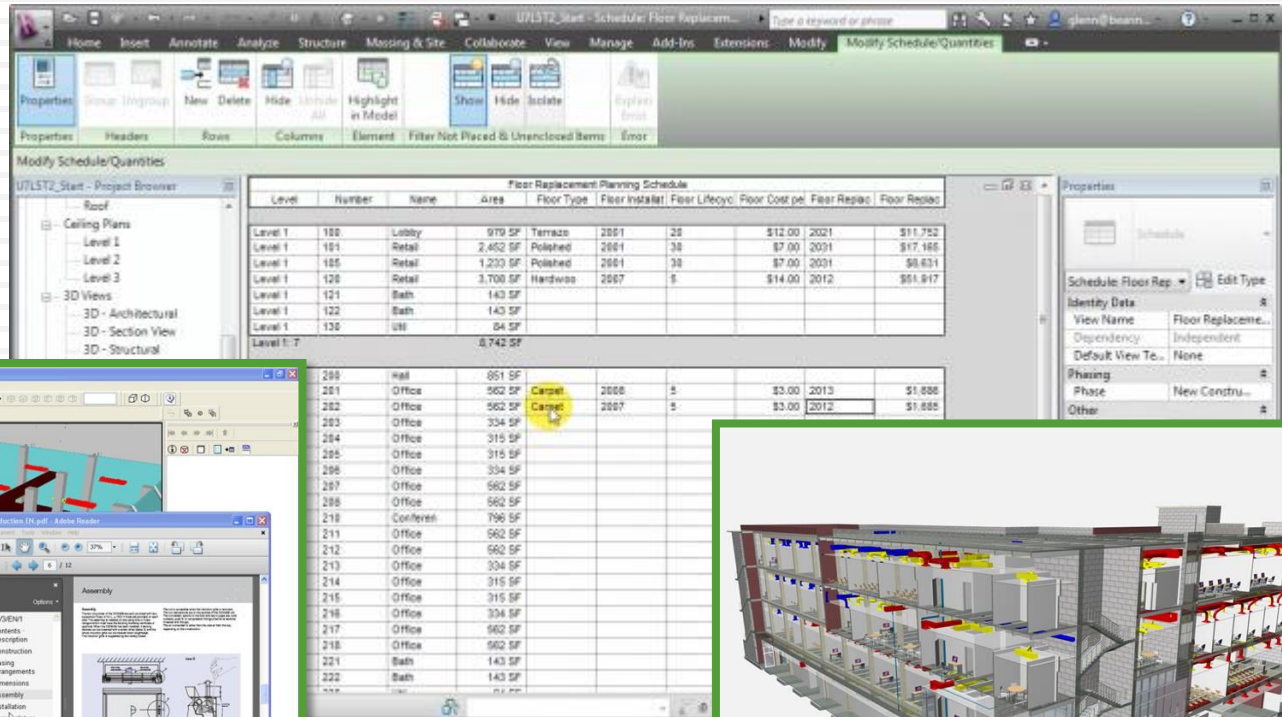
ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2

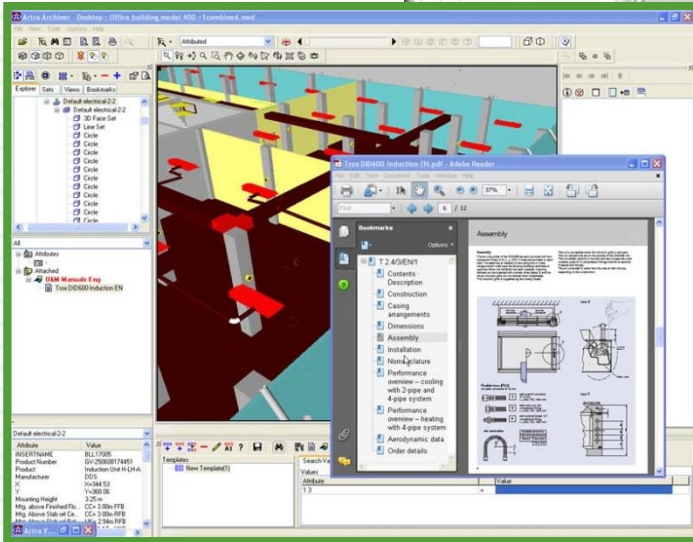


EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

3

Level	Number	Name	Area	Floor Type	Floor Installed	Floor Lifecycle	Floor Cost per	Floor Rep	Floor Repl
Level 1	100	Lobby	979 SF	Terrazo	2001	20	\$12.00	2021	\$11,752
Level 1	101	Retail	2,462 SF	Polished	2001	20	\$7.00	2001	\$17,185
Level 1	105	Retail	1,233 SF	Polished	2001	20	\$7.00	2001	\$8,631
Level 1	120	Retail	3,700 SF	Hardwo	2007	5	\$14.00	2012	\$51,817
Level 1	121	Bath	143 SF						
Level 1	122	Bath	143 SF						
Level 1	130	UH	64 SF						
Level 1:			8,742 SF						
208		Hall	851 SF						
201		Office	562 SF						
202		Office	562 SF	Carpet	2000	5	\$3.00	2013	\$1,686
203		Office	334 SF						
204		Office	315 SF						
205		Office	315 SF						
206		Office	334 SF						
207		Office	562 SF						
208		Office	562 SF						
210		Confere	796 SF						
211		Office	562 SF						
212		Office	562 SF						
213		Office	334 SF						
214		Office	315 SF						
215		Office	315 SF						
216		Office	334 SF						
217		Office	562 SF						
218		Office	562 SF						
221		Bath	143 SF						
222		Bath	143 SF						




RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

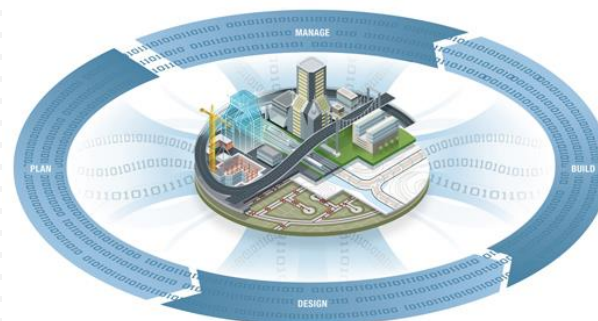
1

ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2

EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

3



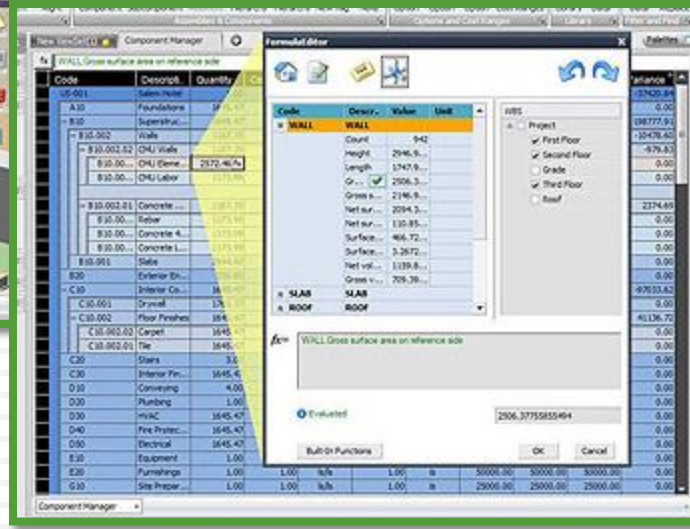
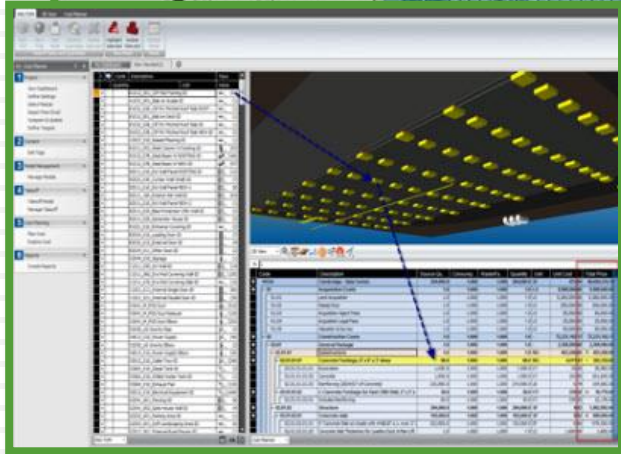
PRESNÝ A PODROBNÝ PREHĽAD  
PREVÁDZKOVÝCH VÝDAVKOV

4

# [ PREHĽAD PREVÁDZKOVÝCH VÝDAVKOV ]



Code	Description	Cost Plan Version 1			Cost Plan Version 2			Variance		
		Quantity	Unit	Price	Quantity	Unit	Price	Quantity	Unit	Price
000	QVMC Acute Care Building	0.0		10,392,948.27	0.0		1,979,894.77	0.0		-8,413,053.50
A	SUBSTRUCTURE	25,189.4	-	4,006,859.84	1.0	-	1,131,813.19	-25,188.4	SF	-2,965,046.65
A10	FOUNDATIONS	25,189.4	-	4,006,859.84	0.0	-	1,131,813.19	-25,189.4	SF	-2,965,046.65
A1010	STANDARD FOUNDATIONS	25,189.4	-	1,058,368.15	1.0	-	894,049.76	-25,188.4	SF	-364,318.39
3	Column Encasement	50.0	EA	100,440.96	0.0		0.00	-50.0	EA	-100,440.96
A1012.300	Pile Caps	54.0	EA	850,027.29	0.0	EA	894,049.76	-54.0	EA	-161,977.54
03.11.00.10	Erect Forms to CIP Concrete - Pile Cap	11,014.3	SF	64,984.21	11,014.3	SF	0.00	0.0	SF	-64,984.21
03.11.00.00	Erect Forms to CIP Concrete - Materials	11,014.3	SF	11,014.27	11,014.3	SF	0.00	0.0	SF	-11,014.27
LCON003	Formwork Carpenter	11,014.3	HR	53,969.95	11,014.3	HR	0.00	0.0	HR	-53,969.95
03.11.00.10	Strip Forms to CIP Concrete - Pile Cap	11,014.3	SF	9,967.92	11,014.3	SF	0.00	0.0	SF	-9,967.92
03.11.00.00	Strip Forms at Pile Cap - Materials	11,014.3	SF	1,101.43	11,014.3	SF	0.00	0.0	SF	-1,101.43
LCON003	Formwork Carpenter	11,014.3	HR	8,866.49	11,014.3	HR	0.00	0.0	HR	-8,866.49
03.11.00.11	Anchor Bolts	54.0	EA	11,512.80	54.0	EA	0.00	0.0	EA	-11,512.80
LCON004.2	Rodman - Anchor Bolt	54.0	HR	11,512.80	54.0	HR	0.00	0.0	HR	-11,512.80
0.0		0.0		0.00	0.0		0.00	-54.0	EA	-4,490.00
0.0		0.0		0.00	0.0		0.00	-54.0	EA	0.00
0.0		0.0		0.00	0.0		0.00	-54.0	HR	-3,240.00



RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1

ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

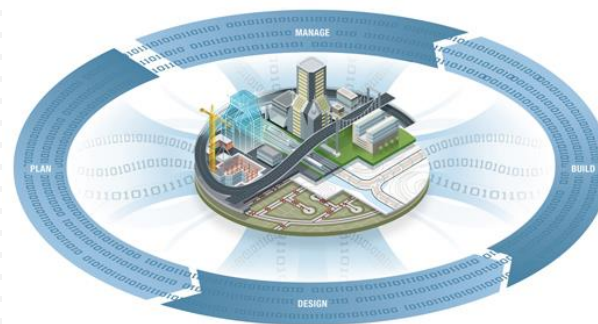
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EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

3

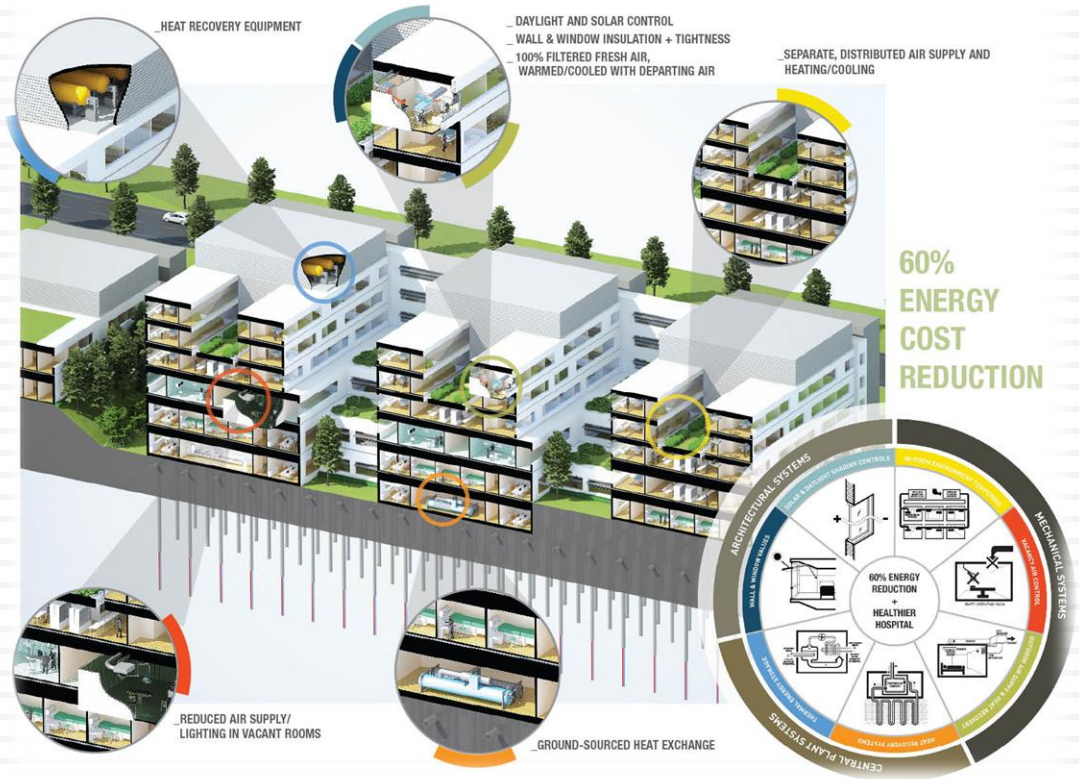
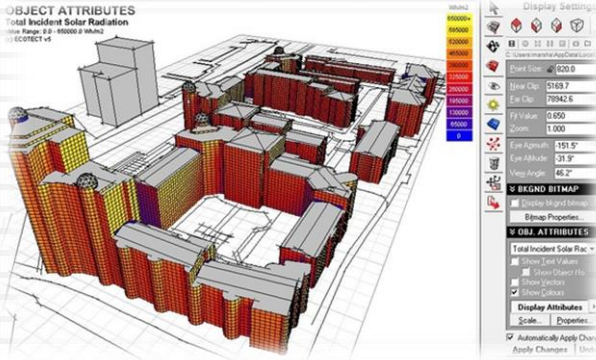
PRESNÝ A PODROBNÝ PREHĽAD PREVÁDZKOVÝCH VÝDAVKOV

4



EFEKTÍVNE VYUŽÍVANIE ENERGIE

5



RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1

ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2

EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

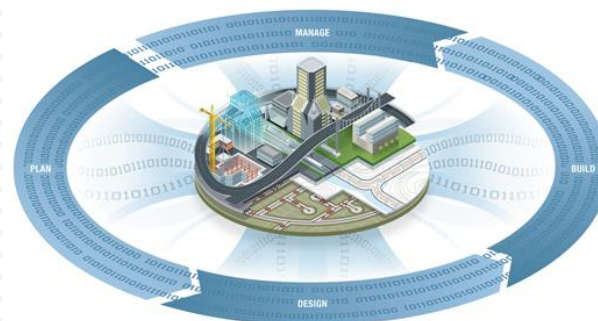
3

PRESNÝ A PODROBNÝ PREHĽAD PREVÁDZKOVÝCH VÝDAVKOV

4

EFEKTÍVNE VYUŽÍVANIE ENERGIE

5



EKONOMICKEJŠIA MODERNIZÁCIA  
A OBNOVA

6





RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1

ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2

EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

3

PRESNÝ A PODROBNÝ PREHĽAD PREVÁDZKOVÝCH VÝDAVKOV

4

EFEKTÍVNE VYUŽÍVANIE ENERGIE

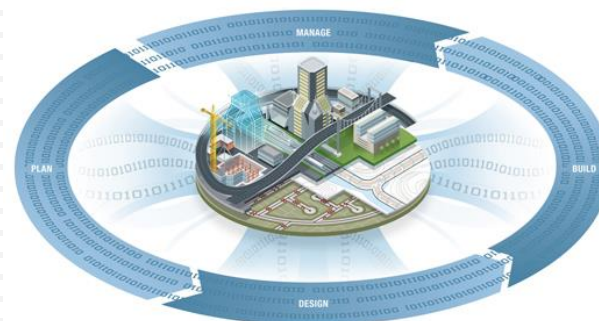
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EKONOMICKEJŠIA MODERNIZÁCIA A OBNOVA

6

VYLEPŠENÝ MANAŽMENT ŽIVOTNÉHO  
CYKLU

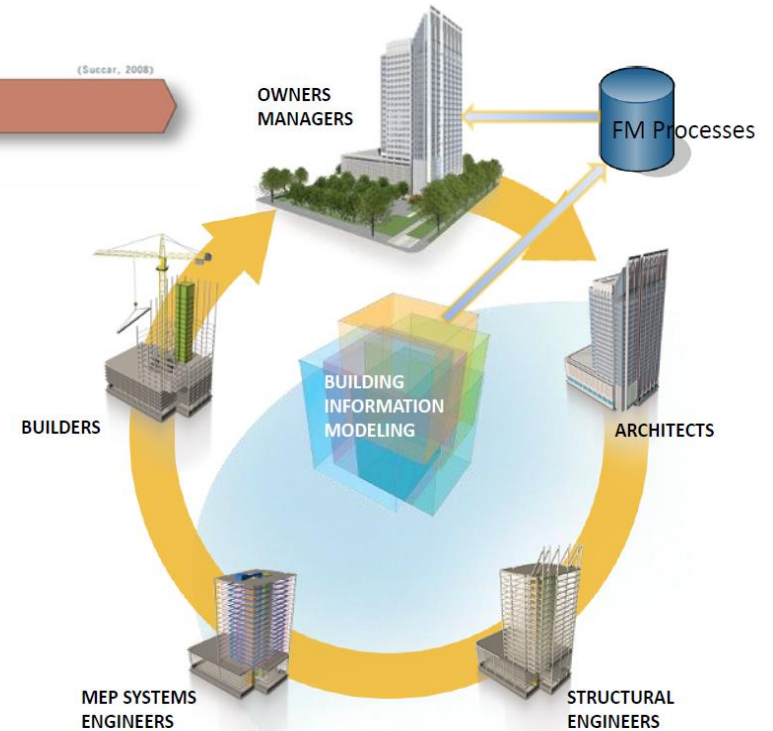
7





y-os: relatívny počet detailov vložených do BIM v každej fáze životného cyklu

„Správnym narábaním s informáciami o budove s použitím BIM môže viesť k podstatným úsporám a to od návrhu cez výstavbu až po údržbu.“  
 [Smith M., *BIM in construction*, 2011]



RÝCHLA DOSTUPNOSŤ INFORMÁCIÍ

1

ZLEPŠENÝ PRIESTOROVÝ MANAŽMENT

2

EFEKTÍVNEJŠIE PLÁNOVANIE ÚDRŽBY

3

PRESNÝ A PODROBNÝ PREHĽAD PREVÁDZKOVÝCH VÝDAVKOV

4

EFEKTÍVNE VYUŽÍVANIE ENERGIE

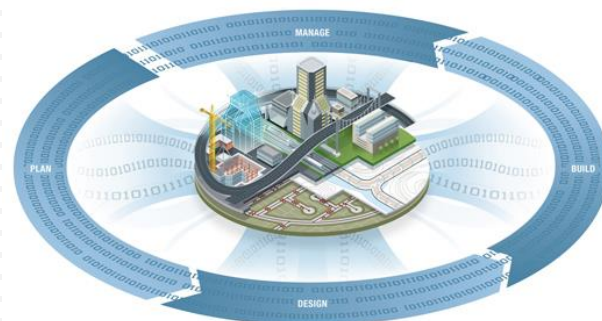
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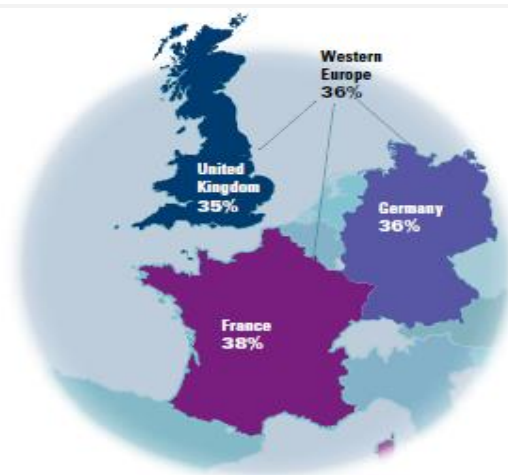
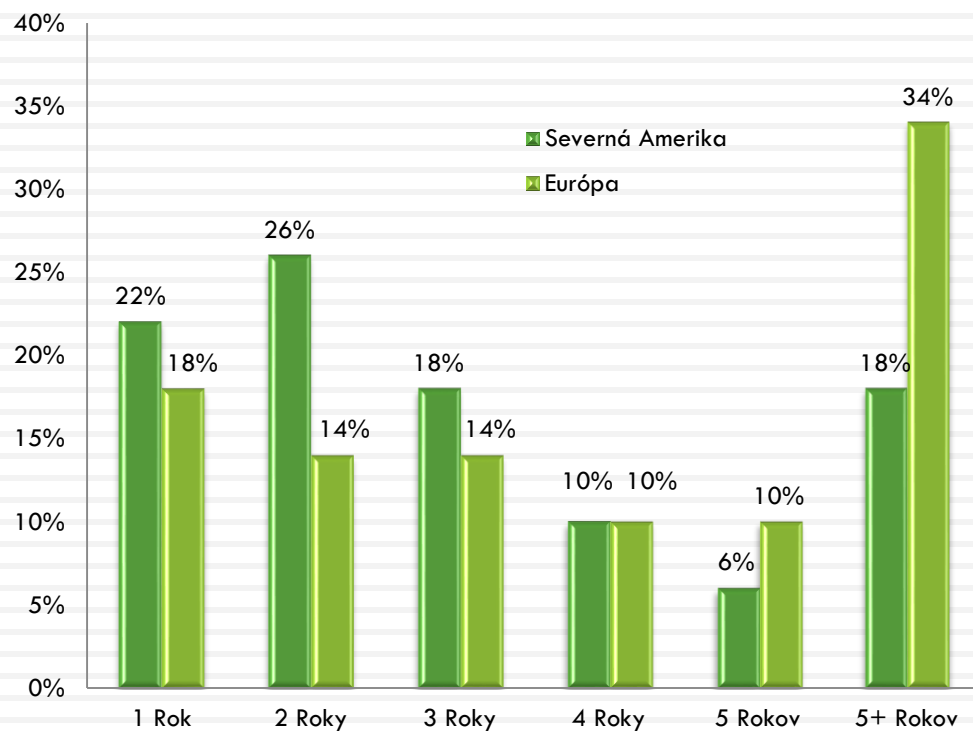
EKONOMICKEJŠIA MODERNIZÁCIA A OBNOVA

6

VYLEPŠENÝ MANAŽMENT ŽIVOTNÉHO CYKLU

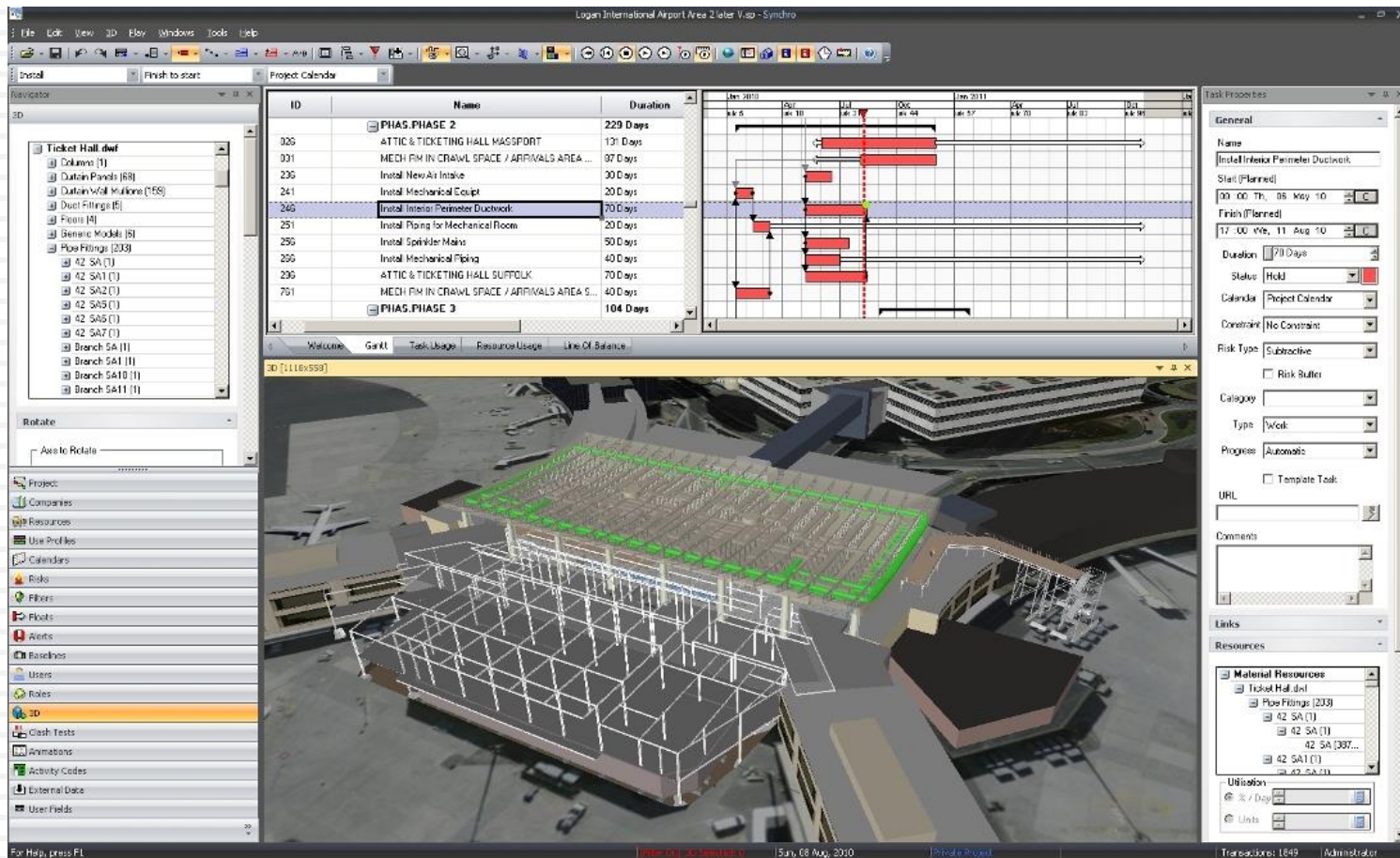
7





*POUŽÍVANIE BIM*  
*SmartMarket Report, 2011*

LOGAN INTERNATIONAL AIRPORT

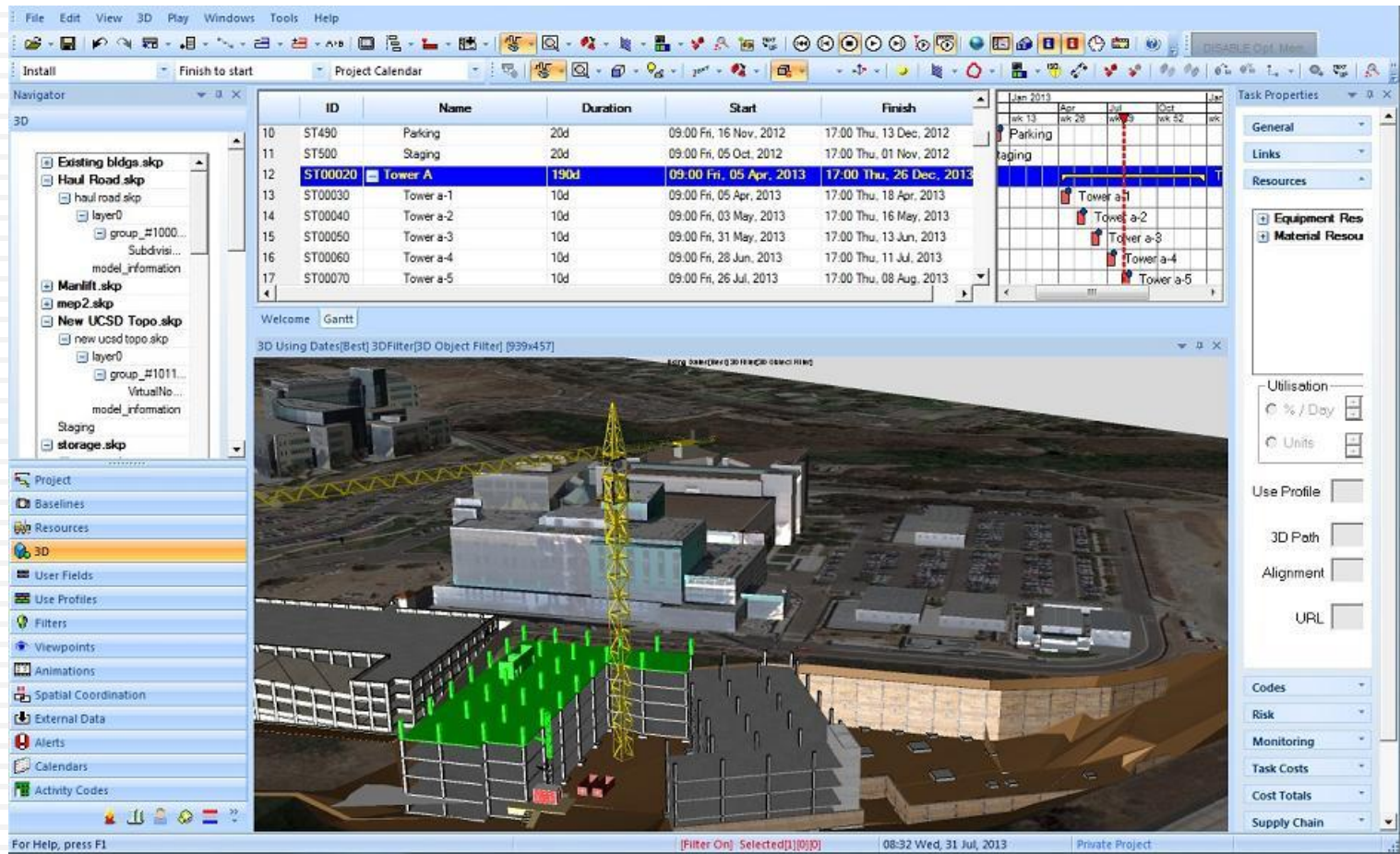


The screenshot displays the Synchro software interface for the Logan International Airport project. The main window is divided into several panels:

- Project Calendar:** A Gantt chart showing task durations from late 2010 to early 2011. A task named "Install Interior Perimeter Ductwork" is highlighted in blue, with a duration of 70 days.
- Task List:** A table listing tasks and their durations:
 

ID	Name	Duration
026	PHAS.PHASE 2	229 Days
031	ATTIC & TICKETING HALL MASSPORT	131 Days
031	MECH RM IN CRAWL SPACE / ARRIVALS AREA ...	97 Days
236	Install New Air Intake	30 Days
241	Install Mechanical Couplet	20 Days
245	Install Interior Perimeter Ductwork	70 Days
251	Install Piping for Mechanical Room	20 Days
256	Install Sprinkler Mains	50 Days
256	Install Mechanical Piping	40 Days
236	ATTIC & TICKETING HALL SUITOUK	70 Days
751	MECH RM IN CRAWL SPACE / ARRIVALS AREA S...	40 Days
	PHAS.PHASE 3	104 Days
- 3D Model:** A wireframe view of the airport terminal building under construction, with a green rectangular area highlighting the location of the selected task.
- Task Properties:** A panel on the right showing details for the selected task:
  - Name: Install Interior Perimeter Ductwork
  - Start: (Planned) 00:00 TH, 05 May 10
  - Finish: (Planned) 17:00 WE, 11 Aug 10
  - Duration: 70 Days
  - Status: Hold
  - Calendar: Project Calendar
  - Constraint: No Constraint
  - Risk Type: Subtractive
  - Category: [Dropdown]
  - Type: [Dropdown]
  - Progress: Automatic
  - URL: [Text Field]
  - Comments: [Text Area]
  - Resources: Material Resources (Ticket Hall.dwt, Pipe Filings (233), 42 SA (1), 42 SA (1), 42 SA (387...), 42 SA (1), 42 SA (1))
  - Utilization: % / Day

MEDICAL CENTER SAN DIEGO



The screenshot displays the SAFM 2014 software interface. On the left is a 3D model of the Medical Center San Diego construction site, featuring a central yellow crane and several building structures. The main window is divided into a Gantt chart at the top and a 3D view below. The Gantt chart lists project tasks with their durations and schedules.

ID	Name	Duration	Start	Finish
10	ST490 Parking	20d	09.00 Fri, 16 Nov, 2012	17.00 Thu, 13 Dec, 2012
11	ST500 Staging	20d	09.00 Fri, 05 Oct, 2012	17.00 Thu, 01 Nov, 2012
12	ST00020 Tower A	190d	09.00 Fri, 05 Apr, 2013	17.00 Thu, 26 Dec, 2013
13	ST00030 Tower a-1	10d	09.00 Fri, 05 Apr, 2013	17.00 Thu, 18 Apr, 2013
14	ST00040 Tower a-2	10d	09.00 Fri, 03 May, 2013	17.00 Thu, 16 May, 2013
15	ST00050 Tower a-3	10d	09.00 Fri, 31 May, 2013	17.00 Thu, 13 Jun, 2013
16	ST00060 Tower a-4	10d	09.00 Fri, 28 Jun, 2013	17.00 Thu, 11 Jul, 2013
17	ST00070 Tower a-5	10d	09.00 Fri, 26 Jul, 2013	17.00 Thu, 08 Aug, 2013

The interface also includes a Navigator on the left with a 3D tree view, a Project Properties panel on the right, and a status bar at the bottom showing the date as Wednesday, July 31, 2013.

# [ THE SHARD, LONDON ]



Name	Duration	Start	End
Slide Man Core to Level 40	2 Days	02/10/10	04/10/10
Slide Man Core to Level 41	3 Days	05/10/10	08/10/10
Slide Man Core to Level 42	3 Days	10/10/10	13/10/10
Slide Man Core to Level 43	3 Days	13/10/10	16/10/10
Slide Man Core to Level 44	3 Days	16/10/10	19/10/10
Slide Man Core to Level 45	3 Days	19/10/10	22/10/10
Slide Man Core to Level 46	3 Days	26/10/10	29/10/10
Slide Man Core to Level 47	3 Days	31/10/10	03/11/10
Slide Man Core to Level 48	3 Days	03/11/10	06/11/10
Slide Man Core to Level 49	3 Days	06/11/10	09/11/10
Slide Man Core to Level 50	2 Days	13/11/10	15/11/10
<b>Slide Man Core L31 to 52</b> 6 Weeks 16/10/10			
Slide Man Core to Level 51	2 Days	16/10/10	18/10/10
Slide Man Core to Level 52	2 Days	18/10/10	20/10/10
Slide Man Core to Level 53	2 Days	20/10/10	22/10/10
Slide Man Core to Level 54	2 Days	24/10/10	26/10/10
Slide Man Core to Level 55	2 Weeks 1	28/10/10	04/11/10
Slide Man Core to Level 56	2 Days	13/11/10	15/11/10
Slide Man Core to Level 57	2 Days	15/11/10	17/11/10
Slide Man Core to Level 58	2 Days	17/11/10	19/11/10
Slide Man Core to Level 59	2 Days	19/11/10	21/11/10
Slide Man Core to Level 60	2 Days	21/11/10	23/11/10
Slide Man Core to Level 61	2 Days	23/11/10	25/11/10
Slide Man Core to Level 62	2 Days	25/11/10	27/11/10
Slide Man Core to Level 63	2 Days	27/11/10	29/11/10
Slide Man Core to Level 64	2 Days	29/11/10	01/12/10
Slide Man Core to Level 65	2 Days	01/12/10	03/12/10
Slide Man Core to Level 66	2 Days	03/12/10	05/12/10
Slide Man Core to Level 67	2 Days	05/12/10	07/12/10
Slide Man Core to Level 68	6 Days	07/12/10	13/12/10
Slide Man Core to Level 69	2 Days	13/12/10	15/12/10
Slide Man Core to Level 70	2 Days	15/12/10	17/12/10
Slide Man Core to Level 71	2 Days	17/12/10	19/12/10
Slide Man Core to Level 72	2 Days	19/12/10	21/12/10
<b>landmark slabs L06 to L74</b> 89 Weeks 06/10/10			

Name	Duration	Start	End
Core Slab access to level L06	1 Day	06/10/10	07/10/10
Core Slab access to level L07	1 Day	07/10/10	08/10/10
Core Slab access to level L08	1 Day	08/10/10	09/10/10
Core Slab access to level L09	1 Day	09/10/10	10/10/10
Core Slab access to level L10	1 Day	10/10/10	11/10/10
Core Slab access to level L11	1 Day	11/10/10	12/10/10
Core Slab access to level L12	1 Day	12/10/10	13/10/10
Core Slab access to level L13	1 Day	13/10/10	14/10/10
Core Slab access to level L14	1 Day	14/10/10	15/10/10
Core Slab access to level L15	1 Day	15/10/10	16/10/10
Core Slab access to level L16	1 Day	16/10/10	17/10/10
Core Slab access to level L17	1 Day	17/10/10	18/10/10
Core Slab access to level L18	1 Day	18/10/10	19/10/10
Core Slab access to level L19	1 Day	19/10/10	20/10/10
Core Slab access to level L20	1 Day	20/10/10	21/10/10
Core Slab access to level L21	1 Day	21/10/10	22/10/10
Core Slab access to level L22	1 Day	22/10/10	23/10/10
Core Slab access to level L23	1 Day	23/10/10	24/10/10
Core Slab access to level L24	1 Day	24/10/10	25/10/10
Core Slab access to level L25	1 Day	25/10/10	26/10/10
Core Slab access to level L26	1 Day	26/10/10	27/10/10
Core Slab access to level L27	1 Day	27/10/10	28/10/10
Core Slab access to level L28	1 Day	28/10/10	29/10/10
Core Slab access to level L29	1 Day	29/10/10	30/10/10
Core Slab access to level L30	1 Day	30/10/10	31/10/10
Core Slab access to level L31	1 Day	31/10/10	01/11/10
Core Slab access to level L32	1 Day	01/11/10	02/11/10
Core Slab access to level L33	1 Day	02/11/10	03/11/10
Core Slab access to level L34	1 Day	03/11/10	04/11/10
Core Slab access to level L35	1 Day	04/11/10	05/11/10
Core Slab access to level L36	1 Day	05/11/10	06/11/10
Core Slab access to level L37	1 Day	06/11/10	07/11/10
Core Slab access to level L38	1 Day	07/11/10	08/11/10
Core Slab access to level L39	1 Day	08/11/10	09/11/10
Core Slab access to level L40	1 Day	09/11/10	10/11/10
Core Slab access to level L41	1 Day	10/11/10	11/11/10
Core Slab access to level L42	1 Day	11/11/10	12/11/10
Core Slab access to level L43	1 Day	12/11/10	13/11/10
Core Slab access to level L44	1 Day	13/11/10	14/11/10
Core Slab access to level L45	1 Day	14/11/10	15/11/10
Core Slab access to level L46	1 Day	15/11/10	16/11/10
Core Slab access to level L47	1 Day	16/11/10	17/11/10
Core Slab access to level L48	1 Day	17/11/10	18/11/10
Core Slab access to level L49	1 Day	18/11/10	19/11/10
Core Slab access to level L50	1 Day	19/11/10	20/11/10
Core Slab access to level L51	1 Day	20/11/10	21/11/10
Core Slab access to level L52	1 Day	21/11/10	22/11/10
Core Slab access to level L53	1 Day	22/11/10	23/11/10
Core Slab access to level L54	1 Day	23/11/10	24/11/10
Core Slab access to level L55	1 Day	24/11/10	25/11/10
Core Slab access to level L56	1 Day	25/11/10	26/11/10
Core Slab access to level L57	1 Day	26/11/10	27/11/10
Core Slab access to level L58	1 Day	27/11/10	28/11/10
Core Slab access to level L59	1 Day	28/11/10	29/11/10
Core Slab access to level L60	1 Day	29/11/10	30/11/10
Core Slab access to level L61	1 Day	30/11/10	01/12/10
Core Slab access to level L62	1 Day	01/12/10	02/12/10
Core Slab access to level L63	1 Day	02/12/10	03/12/10
Core Slab access to level L64	1 Day	03/12/10	04/12/10
Core Slab access to level L65	1 Day	04/12/10	05/12/10
Core Slab access to level L66	1 Day	05/12/10	06/12/10
Core Slab access to level L67	1 Day	06/12/10	07/12/10
Core Slab access to level L68	1 Day	07/12/10	08/12/10
Core Slab access to level L69	1 Day	08/12/10	09/12/10
Core Slab access to level L70	1 Day	09/12/10	10/12/10
Core Slab access to level L71	1 Day	10/12/10	11/12/10
Core Slab access to level L72	1 Day	11/12/10	12/12/10
Core Slab access to level L73	1 Day	12/12/10	13/12/10
Core Slab access to level L74	1 Day	13/12/10	14/12/10



# DNI FACILITY MANAGEMENTU SAFM 2014


MÁJ 2014, BRATISLAVA



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