

BIM: colaboración más allá del diseño

METODOLOGÍAS EXITOSAS Y HERRAMIENTAS PARA CONSTRUCTORAS

JOSE COSCULLUELA,
DAVID VIRTOS
CONSTRUSOFT



CONSTRUSOFT



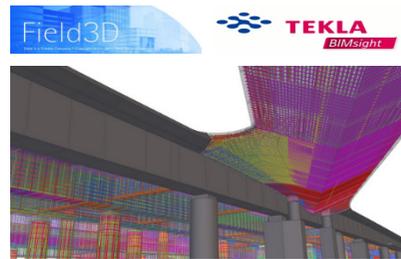
- Somos especialistas en **BIM** desde 1995
- Oficinas en Europa y Latinoamérica y más de 100 empleados
- **Miembro activo de building smart**
- Empresa de Servicios y especialistas en:
 - Soporte Técnico - Más de 30.000 consultas resueltas - Media de 20 minutos
 - Formación Técnica Básicas y a la Carta - Implementación
 - Talleres - Jornadas Técnicas - Charlas - Convenio con Universidades y Asociaciones
 - En Español y otros idiomas: Entorno - Software - Documentación - Soporte
 - **Mas de 100 constructoras como clientes**



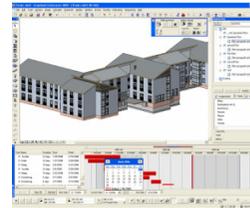
SketchUp



TEKLA Structures



VICO SOFTWARE
Integrating Construction



MANHATTAN
A TRIMBLE COMPANY



Trimble

transforming the way the world works

A large blue banner featuring the Trimble logo on the left, a globe in the center composed of many small images of construction and industrial scenes, and the tagline "transforming the way the world works" on the right.

No siempre BIM tiene un coste



<http://www.teklabimsight.com/>

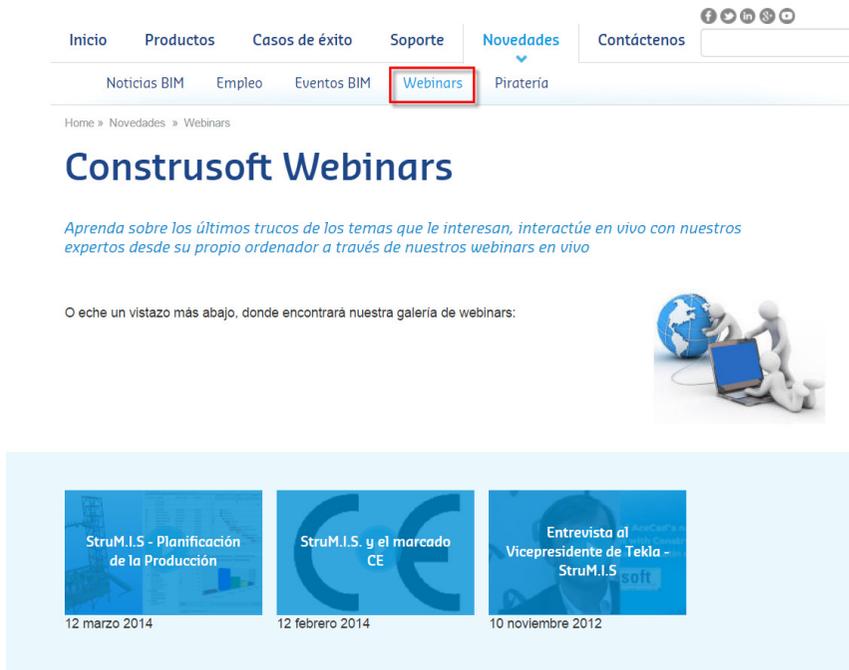


 buildingSMART
International Alliance for Interoperability Spanish Chapter



Webinars de Construsoft

> Calendario webinar: www.construsoft.com



The screenshot shows the website's navigation menu with 'Webinars' highlighted in a red box. Below the menu, the breadcrumb 'Home » Novedades » Webinars' is visible. The main heading is 'Construsoft Webinars', followed by a descriptive paragraph: 'Aprenda sobre los últimos trucos de los temas que le interesan, interactúe en vivo con nuestros expertos desde su propio ordenador a través de nuestros webinars en vivo'. Below this, a small image shows two figures with a globe and a laptop. The text 'O eche un vistazo más abajo, donde encontrará nuestra galería de webinars:' precedes a gallery of three webinar cards:

- StruM.I.S - Planificación de la Producción** (12 marzo 2014)
- StruM.I.S. y el mercado CE** (12 febrero 2014)
- Entrevista al Vicepresidente de Tekla - StruM.I.S** (10 noviembre 2012)



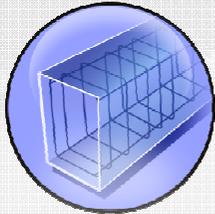


TEKLA® *potential*³

Tekla para Constructoras
Ejemplos reales:
Modelo, planificación y
ejecución



Solución Tekla



Modelo

Creación rápida de modelos precisos.



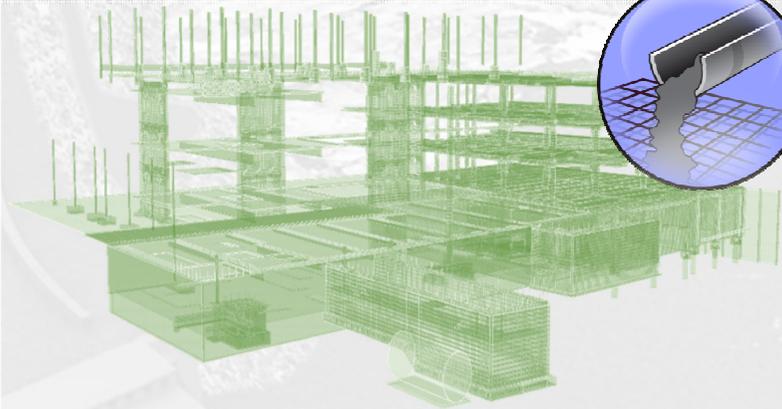
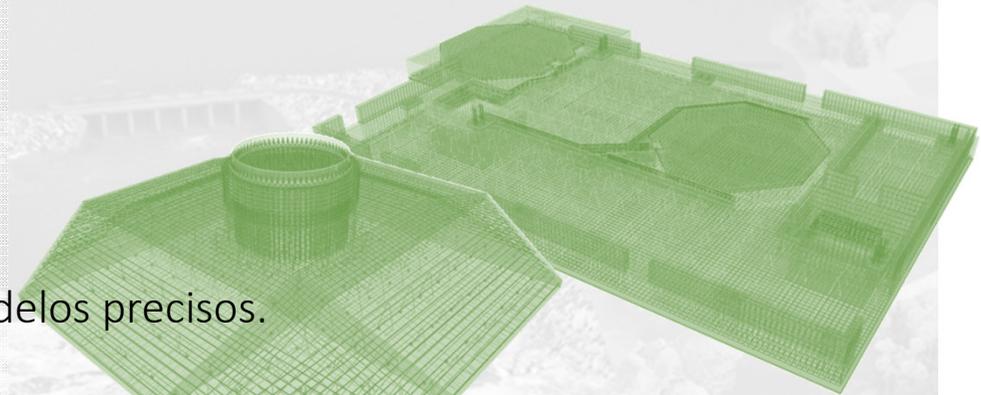
Planificación

Uso del modelo 3D para organizar, estimar y planificar el hormigonado.



Hormigonado

Usar el modelo en obra y sacar el máximo rendimiento



¿Quién se beneficia de usar Tekla en hormigón?



Estimadores,
Mediciones



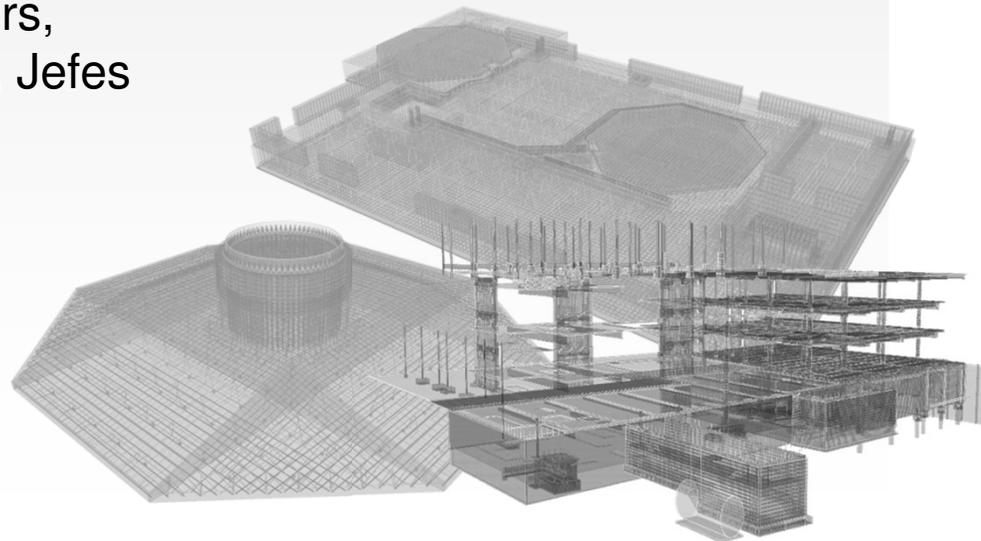
Project Managers,
Ingenieros en obra, Jefes
de obra



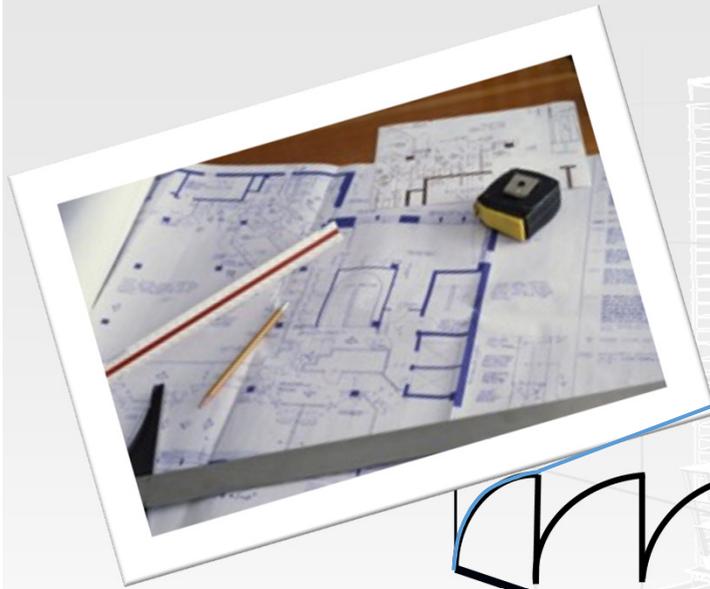
Ingenieros
estructurales



Detalladores de
armaduras



El problema



Diseño

Preconstrucción

Planificación de obra

Gestión de obra

Gestión del mantenimiento

Tiempo

Acumulación de Información

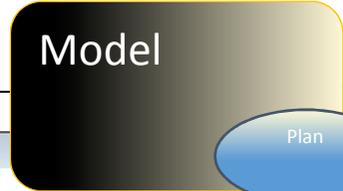
“You can see much more detail in 3D than you can in 2D. A project manager or project engineer can stare at 2D drawing sheets for weeks and still not have as thorough of an understanding as is possible after just 15 minutes of looking at the model.”



Daniel Wayne, Director of
Wayne Brothers Technology, Wayne Brothers

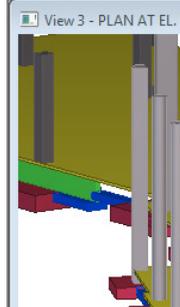
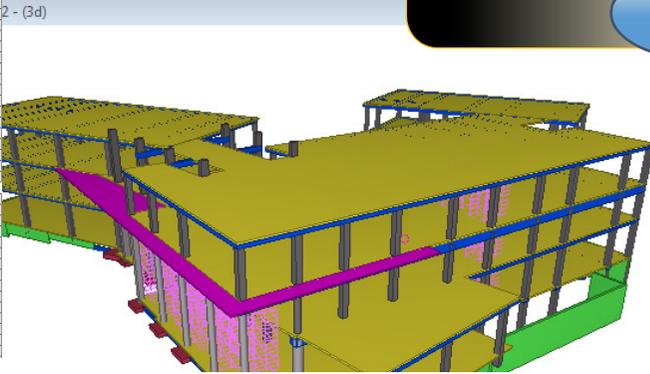


Modelo para mediciones y estimaciones



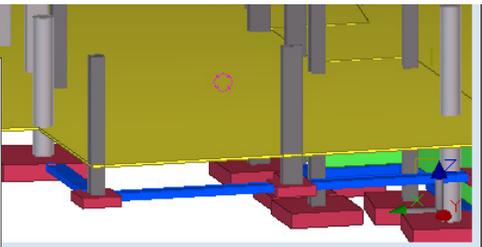
Concrete Takeoff

Project Number:	PROJ#	Name:	PROJ NAME	Date:	5/5/2011	Time:	04:38:32pm	Total Volume
QTY.	Mark	Name	Profile	Depth/Height	Forms	Volume (cu. yd.)		
SPREAD FOOTING								
LEVEL 0	4	FG1	PAD FOOTING	96'X96"	1'-9"	53.33	3.95	15.9
LEVEL 0	2	FG2	PAD FOOTING	108'X108"	1'-10"	66	5.5	11
LEVEL 0	5	FG3	PAD FOOTING	120'X120"	2'-0"	80	7.41	37.04
LEVEL 0	3	FG4	PAD FOOTING	132'X132"	2'-3"	99	10.08	39.25
LEVEL 0	2	FG5	PAD FOOTING	48'X48"	1'-4"	21.33	0.79	1.58
LEVEL 0	2	FG6	PAD FOOTING	182'X182"	3'-0"	192	28.44	56.89
LEVEL 0	6	FG7	PAD FOOTING	144'X144"	2'-0"	120	13.33	60
LEVEL 0	3	FG8	PAD FOOTING	156'X156"	2'-0"	130	15.65	46.94
LEVEL 0	1	FG10	PAD FOOTING	134'X170"	2'-0"	101.33	11.72	11.72
LEVEL 1	11	FG1	PAD FOOTING	96'X96"	1'-8"	53.33	3.95	43.46
LEVEL 1	14	FG2	PAD FOOTING	108'X108"	1'-10"	66	5.5	77
LEVEL 1	9	FG3	PAD FOOTING	120'X120"	2'-0"	80	7.41	66.67
LEVEL 1	3	FG4	PAD FOOTING	132'X132"	2'-3"	99	10.08	30.25
LEVEL 1	4	FG7	PAD FOOTING	144'X144"	2'-0"	120	13.33	53.33
LEVEL 1	3	FG8	PAD FOOTING	156'X156"	2'-0"	130	15.65	46.94
LEVEL 1	5	FG9	PAD FOOTING	72'X72"	1'-6"	36	2	10
LEVEL 1	2	FG11	PAD FOOTING	188'X188"	2'-0"	140	18.15	36.3
WALL FOOTING								
LEVEL 0	1	WF8	STRIP FOOTING	48'X16"	31'-3.34"	83.5	6.18	6.18
LEVEL 0	1	WF9	STRIP FOOTING	48'X16"	26'-10"	68.9	5.1	5.1
LEVEL 0	1	WF10	STRIP FOOTING	48'X16"	14'-2.34"	15.6	2.81	2.81
LEVEL 0	1	WF12	STRIP FOOTING	48'X16"	6'-4.12"	17	1.26	1.26
LEVEL 0	1	WF13	STRIP FOOTING	48'X16"	7'-5"	20	1.48	1.48
LEVEL 0	1	WF16	STRIP FOOTING	48'X16"	23'-0"	61.3	4.54	4.54
LEVEL 0	1	WF17	STRIP FOOTING	48'X16"	7'-0"	18.7	1.38	1.38
LEVEL 0	1	WF18	STRIP FOOTING	48'X16"	92'-1.14"	46.4	33.82	33.82
LEVEL 0	2	WF19	STRIP FOOTING	48'X16"	7'-5"	19.8	1.47	2.93
LEVEL 0	1	WF20	STRIP FOOTING	30'X12"	5'-1.58"	10.3	0.48	0.48
LEVEL 0	1	WF21	STRIP FOOTING	48'X16"	12'-6"	33.3	2.47	2.47
LEVEL 0	1	WF22	STRIP FOOTING	48'X16"	13'-0"	34.7	2.57	2.57
LEVEL 0	1	WF23	STRIP FOOTING	48'X16"	3'-3.88"	8.8	0.6	0.6
LEVEL 0	1	WF25	STRIP FOOTING	48'X16"	9'-11"	26.4	1.96	1.96
LEVEL 0	1	WF26	STRIP FOOTING	48'X16"	25'-5.14"	76.3	5.82	5.82



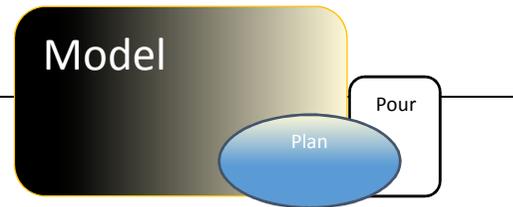
“Se realizó el modelo en aproximadamente 4 horas la noche anterior a la reunión...se ganó el trabajo”

Brett Haley
Project Estimator, Miller, Long & Arnold

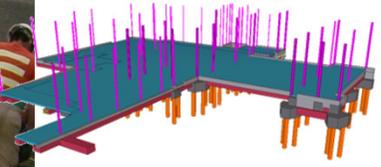


PROJ NAME	FW	SW	PIW	SG	FM	COL	SS	SD	BM	BOTT	BM	SIDE	MP	ST	PC	FG	WF	FM	GB	P
	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Sq. Ft.	Cu. Yds.								
LEVEL 1	0	0	0	0	13183.82	0	1033.33	0	0	0	0	0	0	0	0	49.3	10.17	0	0	0
LEVEL 2	0	0	0	0	0	0	0	12986.04	0	1199.84	2757.61	0	0	0	0	0	0	0	0	0
LEVEL 3	0	0	0	0	0	0	540	13020.14	0	751.56	1840.04	0	0	0	0	0	0	0	0	0
LEVEL 4	0	0	0	0	0	0	232	0	0	0	0	0	0	0	0	0	0	0	0	0

Mediciones – Take off



“Está todo en el modelo...”

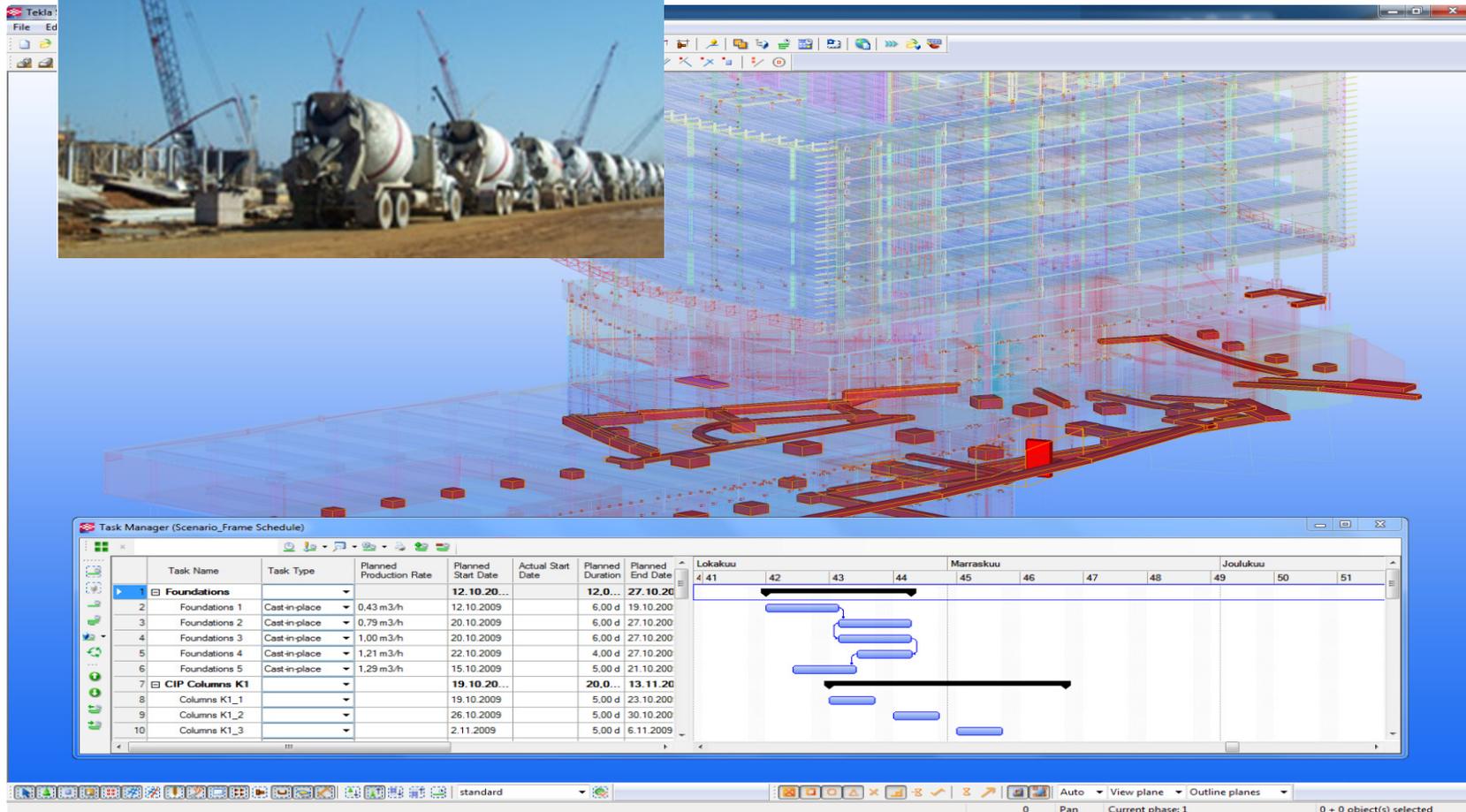
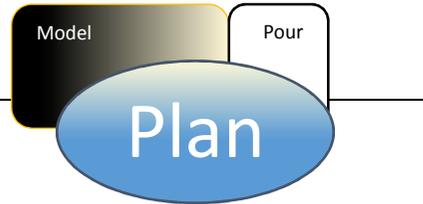


“Después de muchos hormigonados, preferimos las cuantías de Tekla respecto a nuestras estimaciones”



Aaron Stegmeier
A.R. STEGMEIER ENT. INC.

Planificación de la producción



Encofrados

Model

Pour

Plan

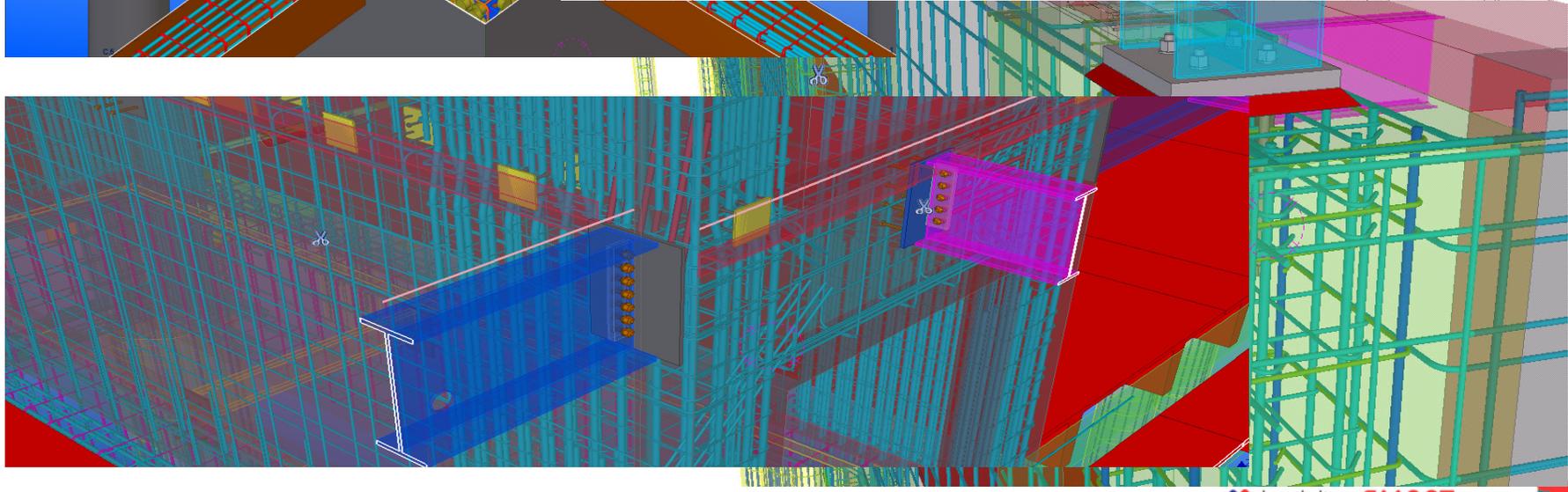
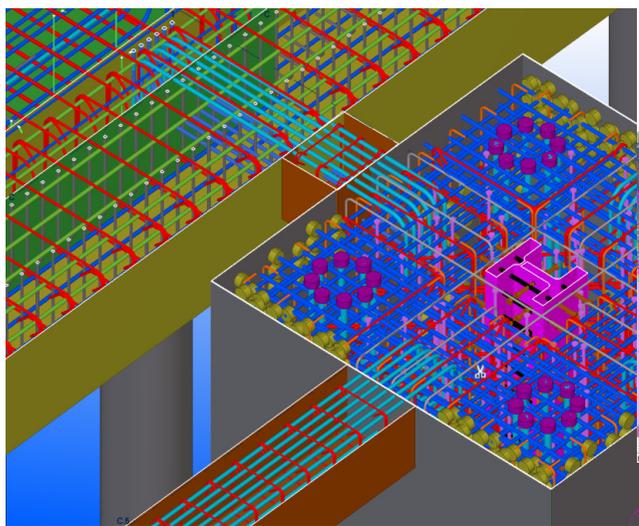
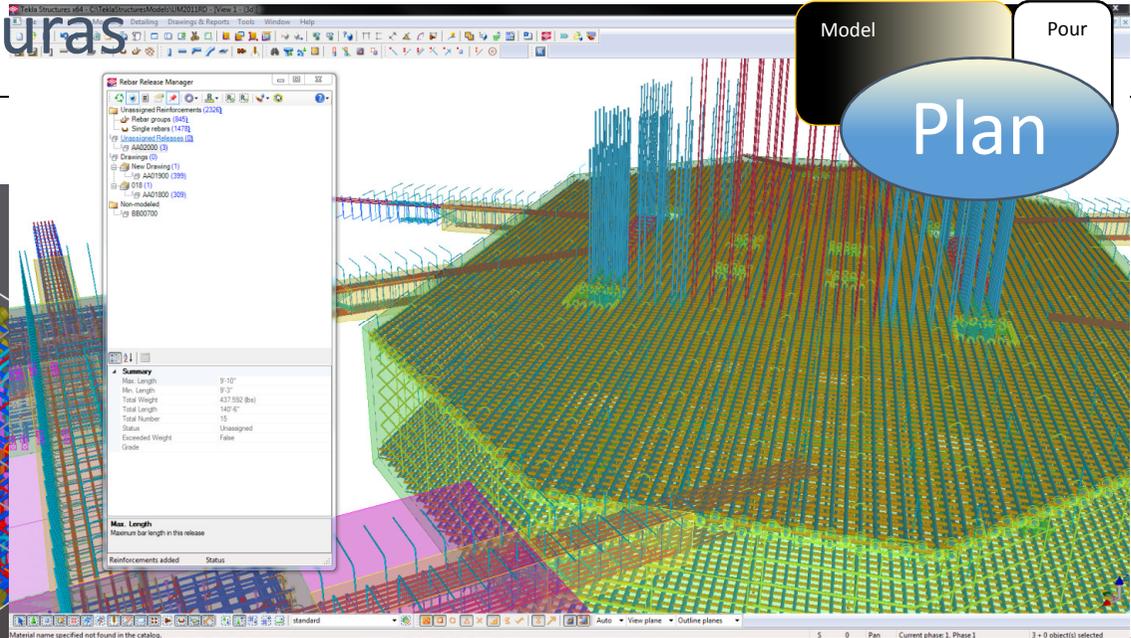
Todo está en el modelo...

- Tableros contrachapados
- Espárragos / palometas
- Guías de muros



Detallado de armaduras

Model
Pour
Plan





“
All of our tenders are now
completed with Tekla. The
quantities are **accurate** and
we get them **50% faster.**”

Rob Smith, Director

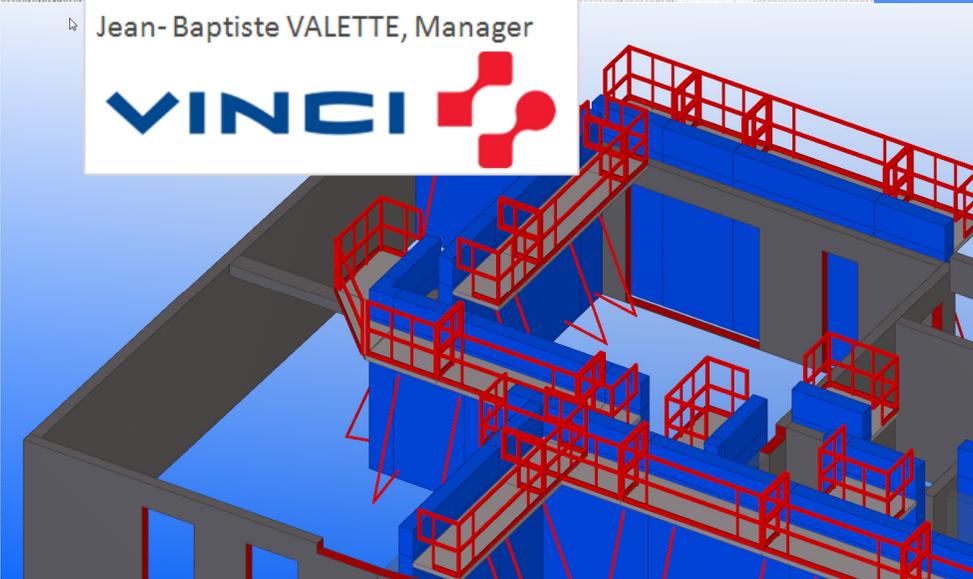
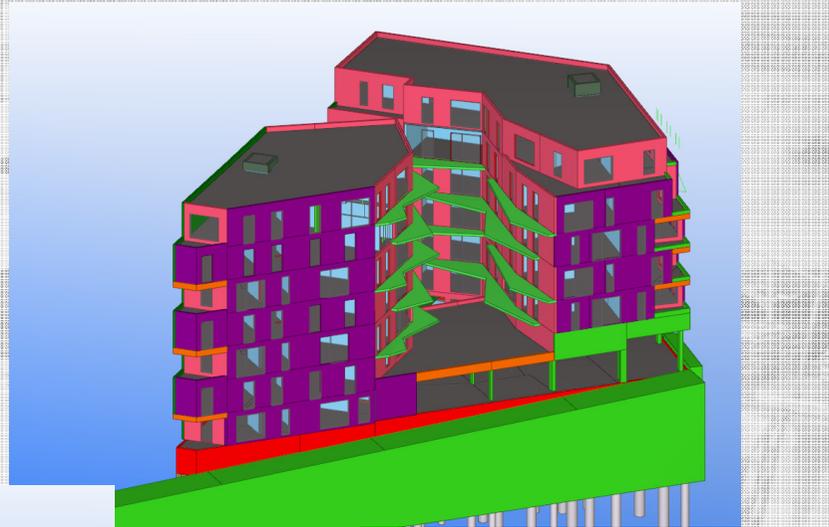


“

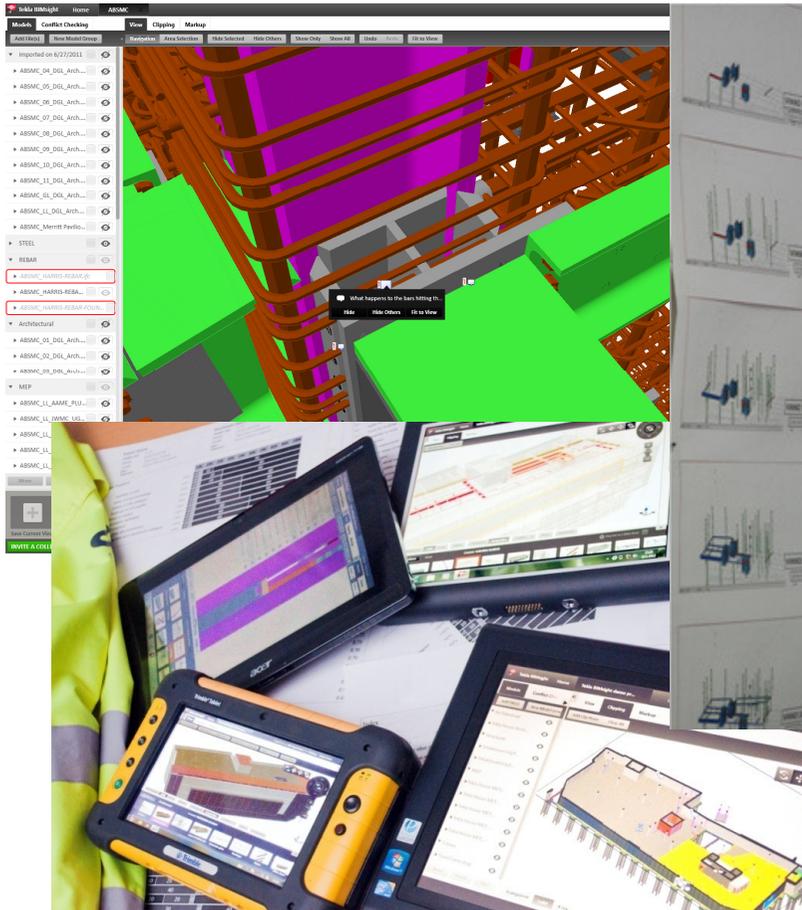
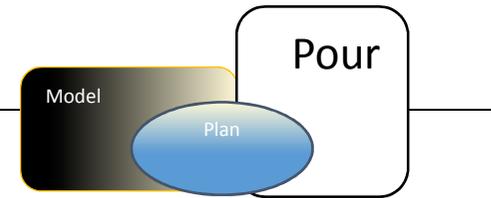
Once the model is created, we can be certain to be more efficient in terms of time and cost as all quantity take-offs, product drawings and reviews can be automatically extracted.”

“It is also a good way to communicate with the other partners of the project.”

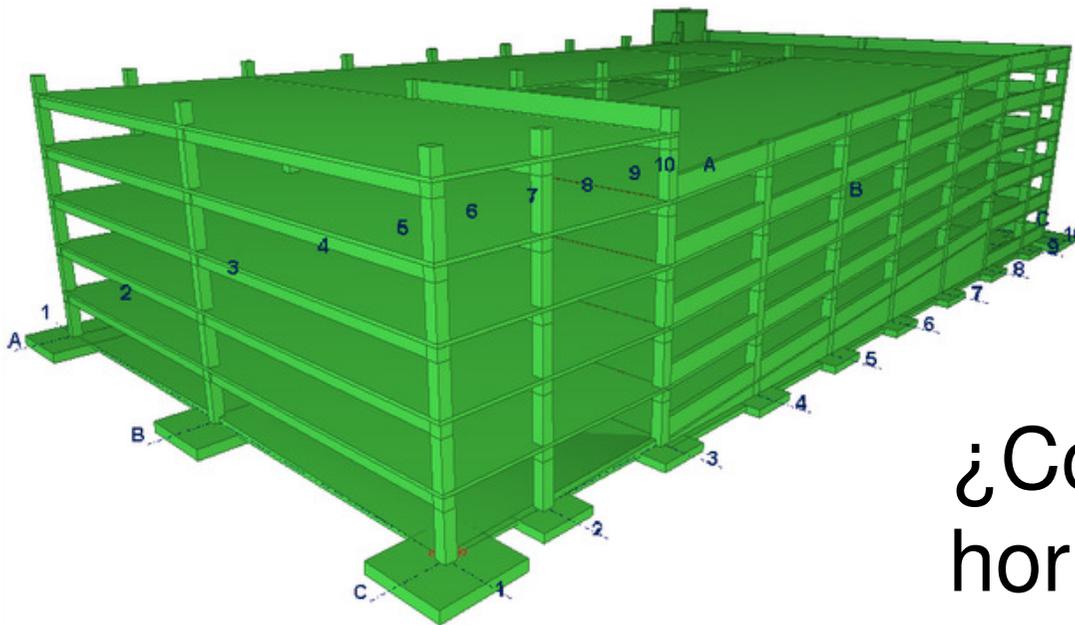
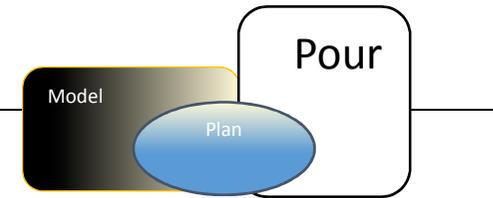
Jean- Baptiste VALETTE, Manager



Preparando el hormigonado

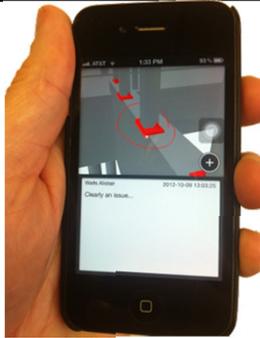
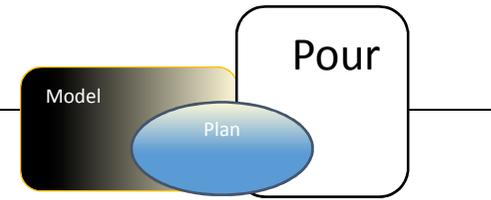


Gestión de hormigonado



¿Cómo
hormigonamos?

Gestión y Seguimiento de la Producción

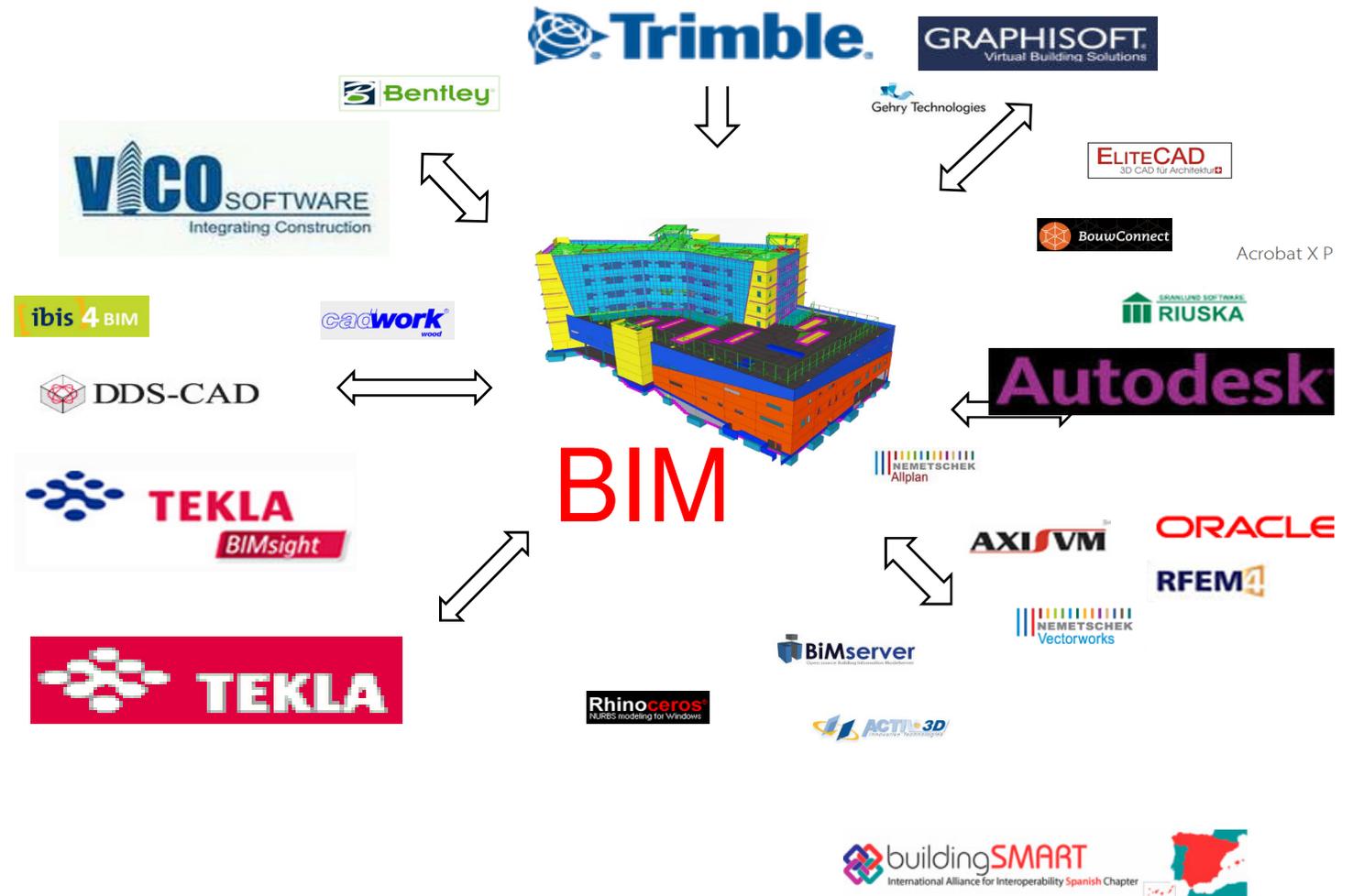


**TEKLA: OBRAS CONSTRUÍDAS COMO SE
MODELARON .**

BIM: utilizando la i , de BIM LOGÍSTICA, PLANIFICACIÓN Y GESTIÓN DE PROYECTOS

BIM: utilizando la i, de BIM interoperabilidad

iFC

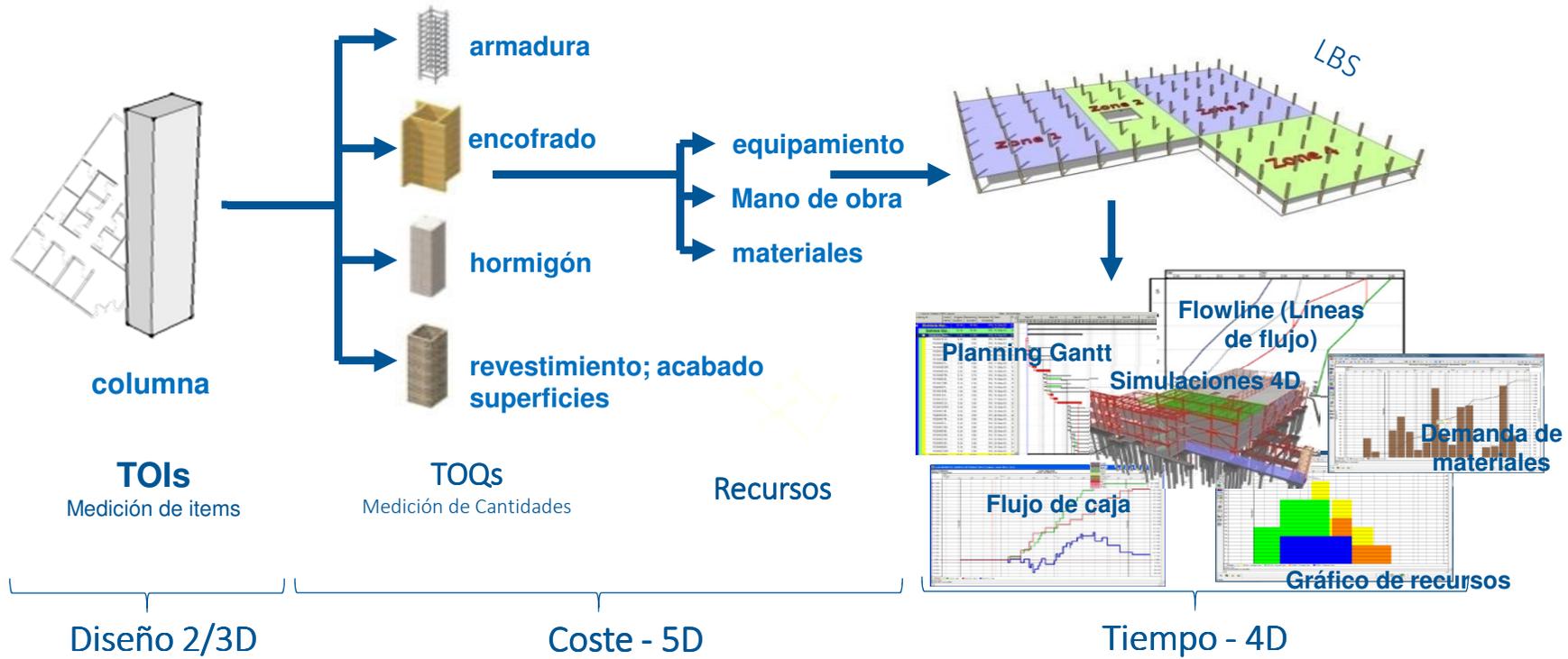




Vico Office BIM optimización de:

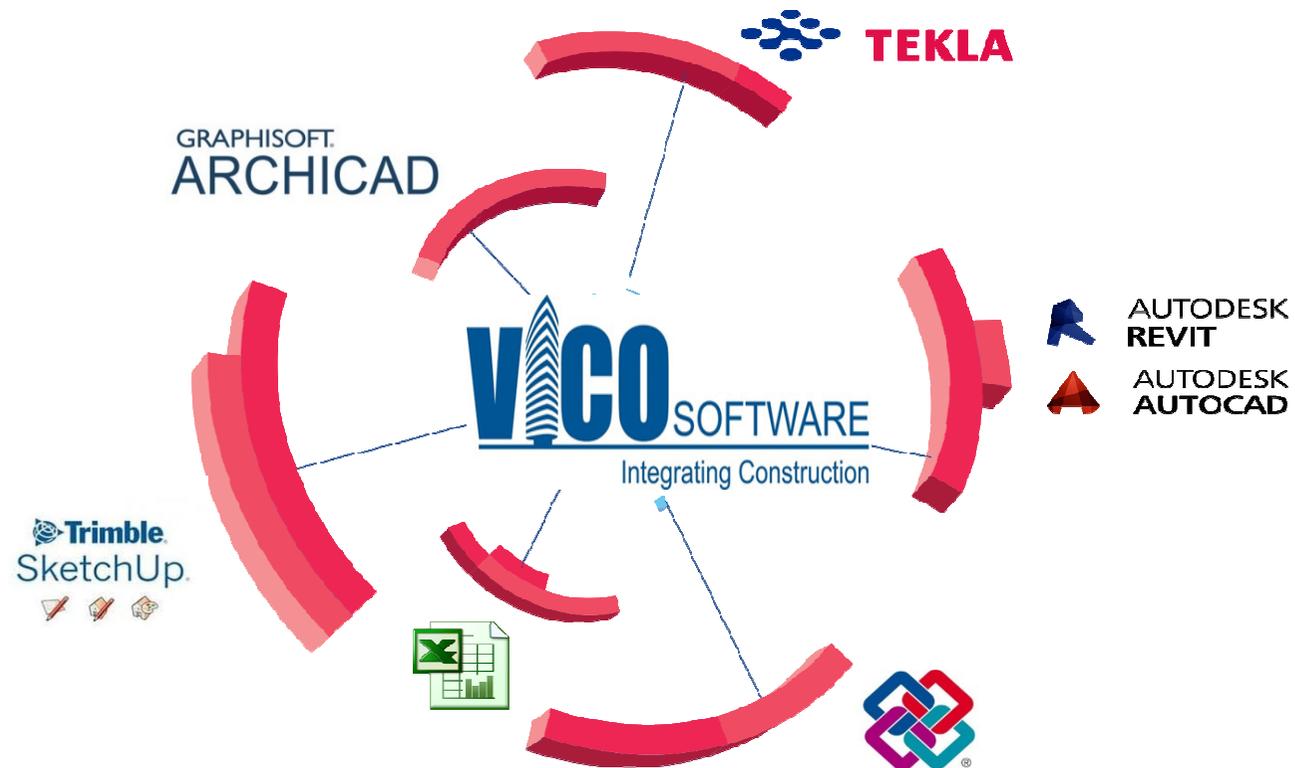
- 5D – Conectar Costes al modelo 3D
 - Mediciones precisas
 - Estimación
 - Control
- 4D – Conectar tiempo al modelo 3D
 - Acortar duración del proyecto
 - Planificación & simulación
 - Control y reacción

2D – 3D – 4D – 5D

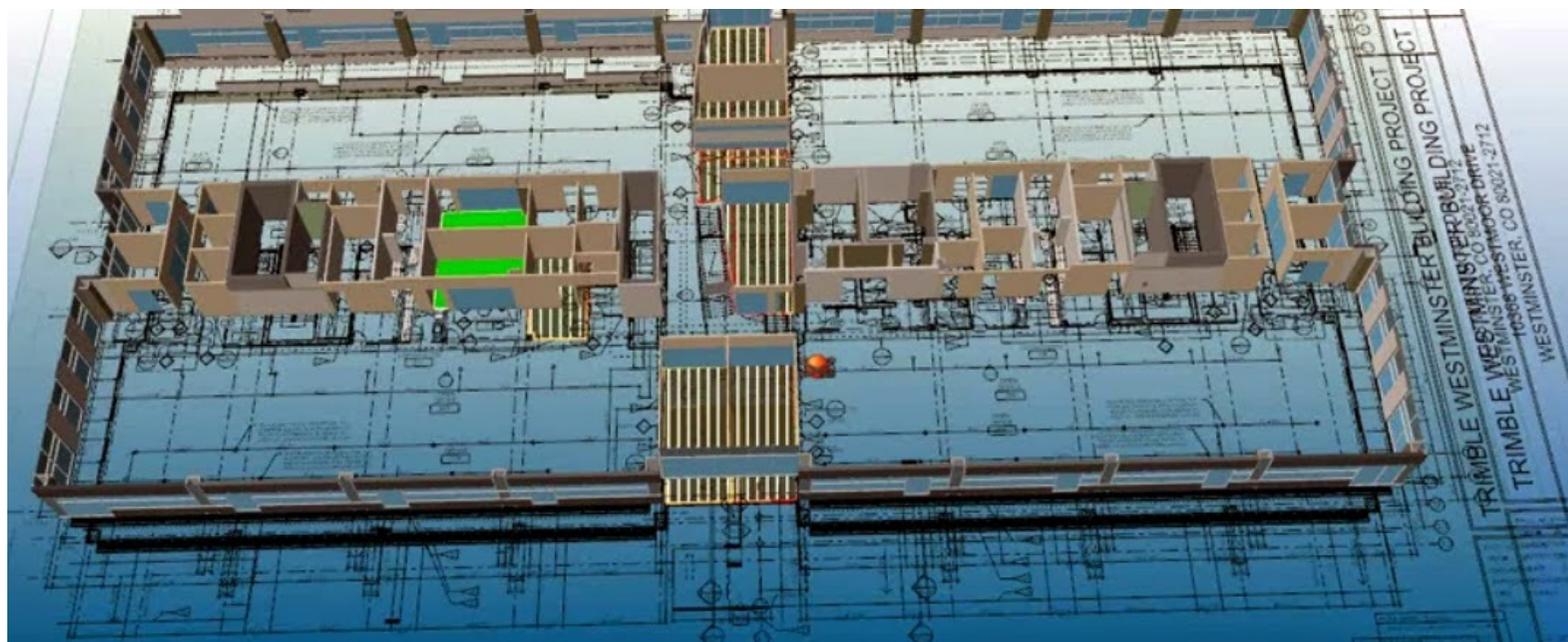


Vico Office

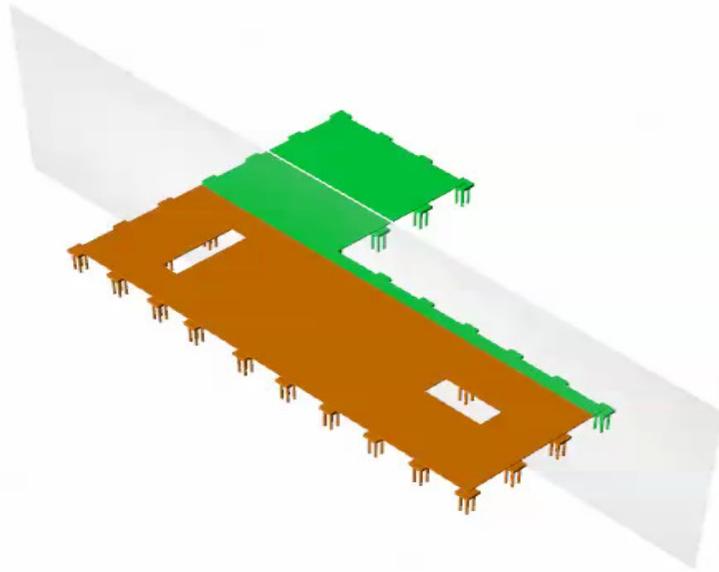
Publicar el modelo a Vico Office directamente desde software externo o IFC.



Controlador de Documentos

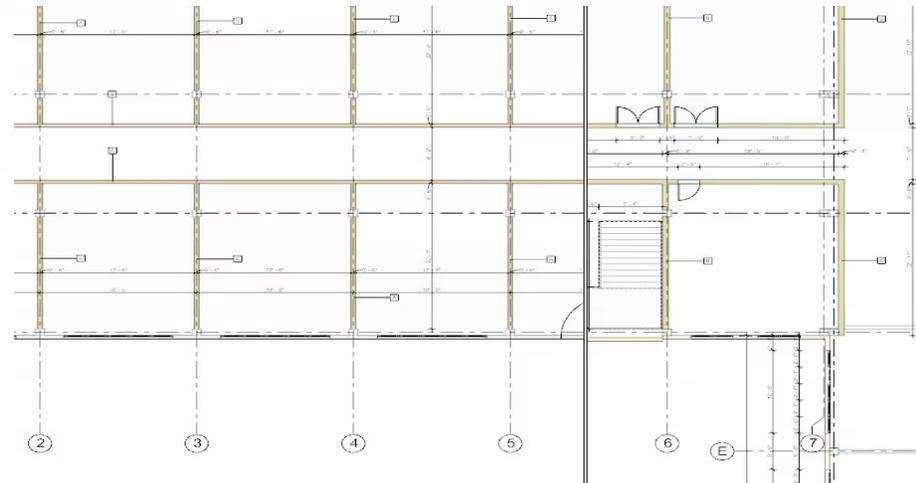


Controlador de Documentos



Modelo 3D → Modelo 3D

PDF 2D → PDF 2D



Costes conectados al modelo 3D

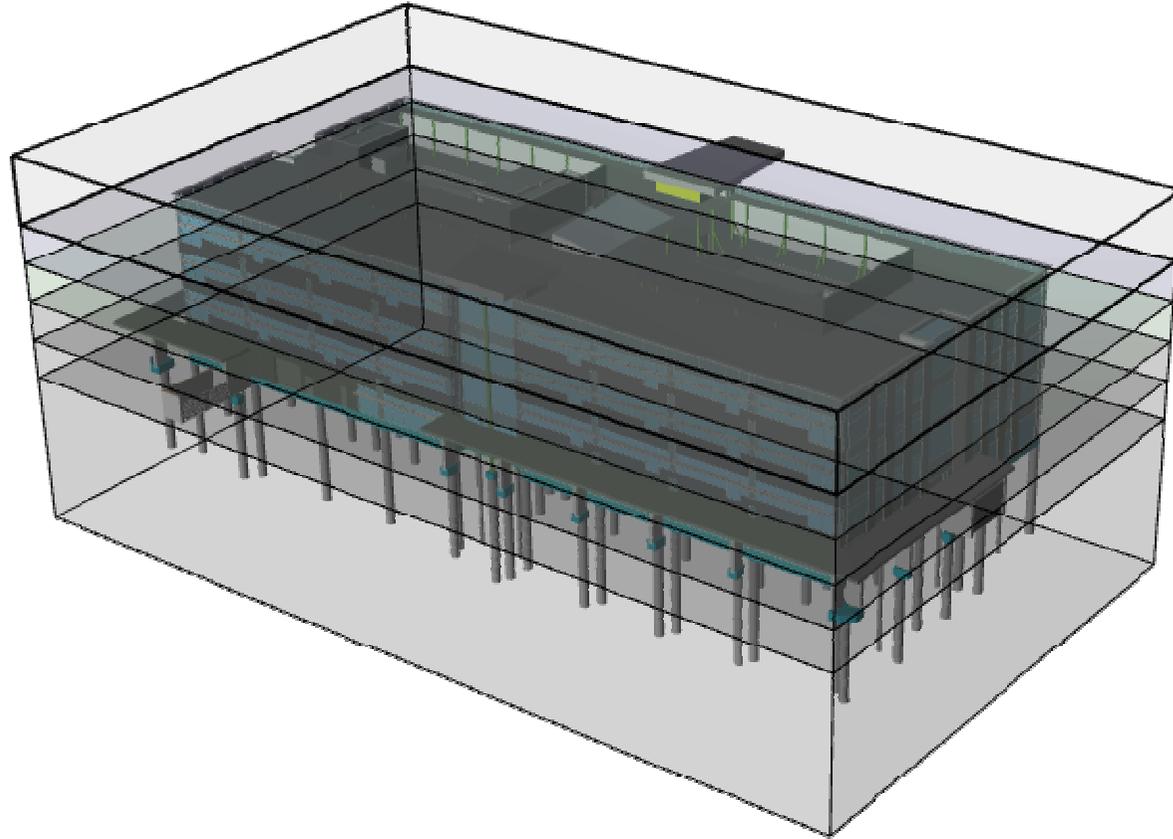
The screenshot displays a software interface for cost management. On the left is a 3D model of a building structure. On the right is a table with columns: Info, Code, Name, Type, Mapped, and Count. Below this is a summary table with columns: Name, Unit, Mapped, and Project. At the bottom is a detailed cost breakdown table with columns: Code, Description, Source Q., Consump., Waste, Qty, UOM, Unit Cost, Base Cost, Cost/Par., and %/Parent.

Info	Code	Name	Type	Mapped	Count
+		2B(22.21.41)-31 betonwand 200		No	
+		2B(28.11.21)-28_ligger_l_sheddak		No	
+		2B(28.11.21)-28_oplegconstructie_gelamineerde_ligger		No	
+		2B(28.11.21)-staaf_staaft d=20mm		No	
+		2B(28.11.21)-UNP 140		No	
+		2C(27.10)-27_dakopstand_daklicht		No	
+		2C(27.10)-27_dakopstand_shed		No	
+		2C(27.10)-27_dakopstand_shed_afgesneden		No	
+		2C(27.11)-27 dak 185 iso + 80 grind		No	
+		2C(27.12)-27 glasdak hal		No	
+		2C(47.11.78)-groendak (mos sedum)		No	
+		2C(47.11.78)-groendak staal (mos sedum)		No	
+		2D(21.10)-21 buitenwand kelderisolatie		Yes	

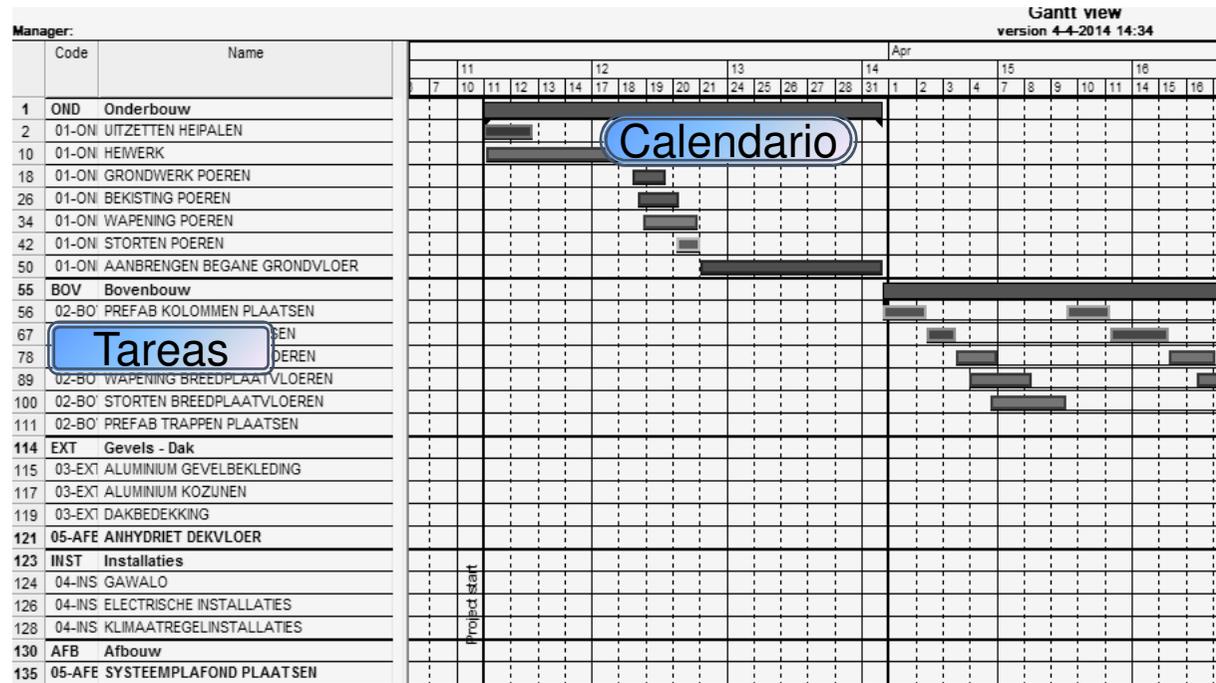
Name	Unit	Mapped	Project
Count	EA	No	49,0
Length	m	No	164,0
Net Reference Side Surface Area	M2	Yes	479,1
Net Opposite Reference Side Surface Area	M2	No	479,1
Top Surface Area	M2	No	19,7
Bottom Surface Area	M2	No	19,7

Code	Description	Source Q.	Consump.	Consump.	Waste	Qty	UOM	Unit Cost	Base Cost	Cost/Par.	%/Parent.
000	JP van Eesteren	1,0	1,000	1,000	1,000			662.829,76	662.829,76	N/A	N/A
00	PROJECTORGANISATIE	1,0	1,000	1,000	1,000	1,0	pst	399.200,00	399.200,00	399.200,00 /	60,23 %
10	ONDERBOUW	23,0	1,000	1,000	1,000	23,0	pst	6.065,22	139.500,00	139.500,00 /	21,05 %
20	RUWBOUW	242,0	1,000	1,000	1,000	242,0	pst	11,88	2.874,78	2.874,78 /	0,43 %
21.	Buitenwanden	566,0	1,000	1,000	1,000	566,0	m2	0,00	0,00	0,00 / pst	0,00 %
22.	Binnenwanden	1.000,0	1,000	1,000	1,000	1.000,0	m2	2,87	2.874,78	11,88 / pst	100,00 %
22.13	scheidingswand Metal stud	479,1	1,000	1,000	1,000	479,1	m2	6,00	2.874,78	0,00 / m2	100,00 %
A080	Afbouwtimmerman	479,1	0,160	6,250	1,000	76,7	HR	37,50	2.874,78	6,00 / m2	100,00 %
23.	Vloeren	224,0	1,000	1,000	1,000	224,0	m2	0,00	0,00	0,00 / pst	0,00 %
24.	Trappen, hellingen	25.255,0	1,000	1,000	1,000	25.255,0	st	0,00	0,00	0,00 / pst	0,00 %
27.	Daken	224,0	1,000	1,000	1,000	224,0	m2	0,00	0,00	0,00 / pst	0,00 %
28.	Hoofddraagconstructie	242,0	1,000	1,000	1,000	242,0	pst	0,00	0,00	0,00 / pst	0,00 %
30	AFBOUW	12.421,0	1,000	1,000	1,000	12.421,0	pst	0,99	12.240,42	12.240,42 /	1,85 %

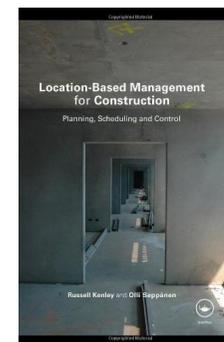
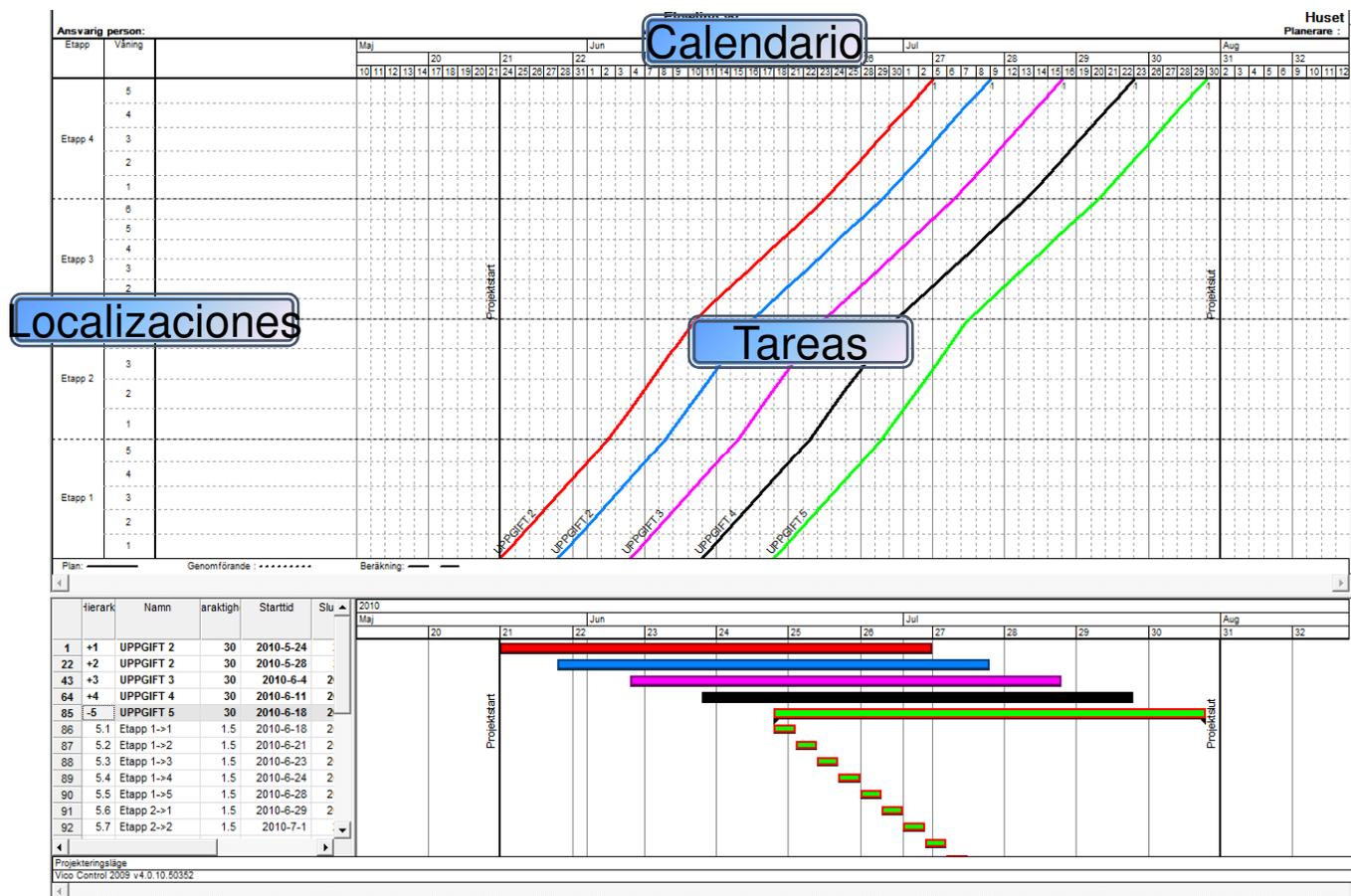
La Importancia de las Cantidades por Localización



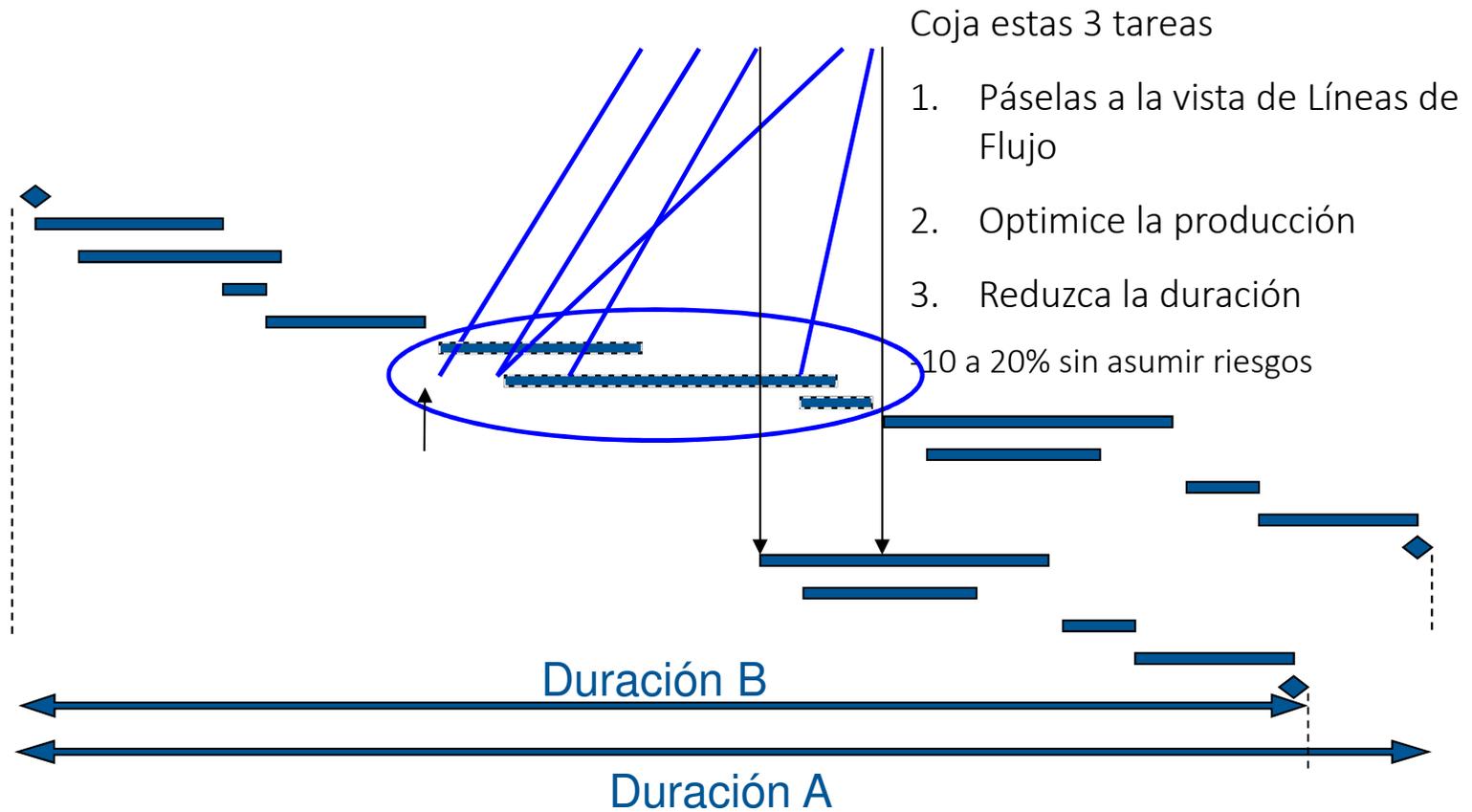
Gantt



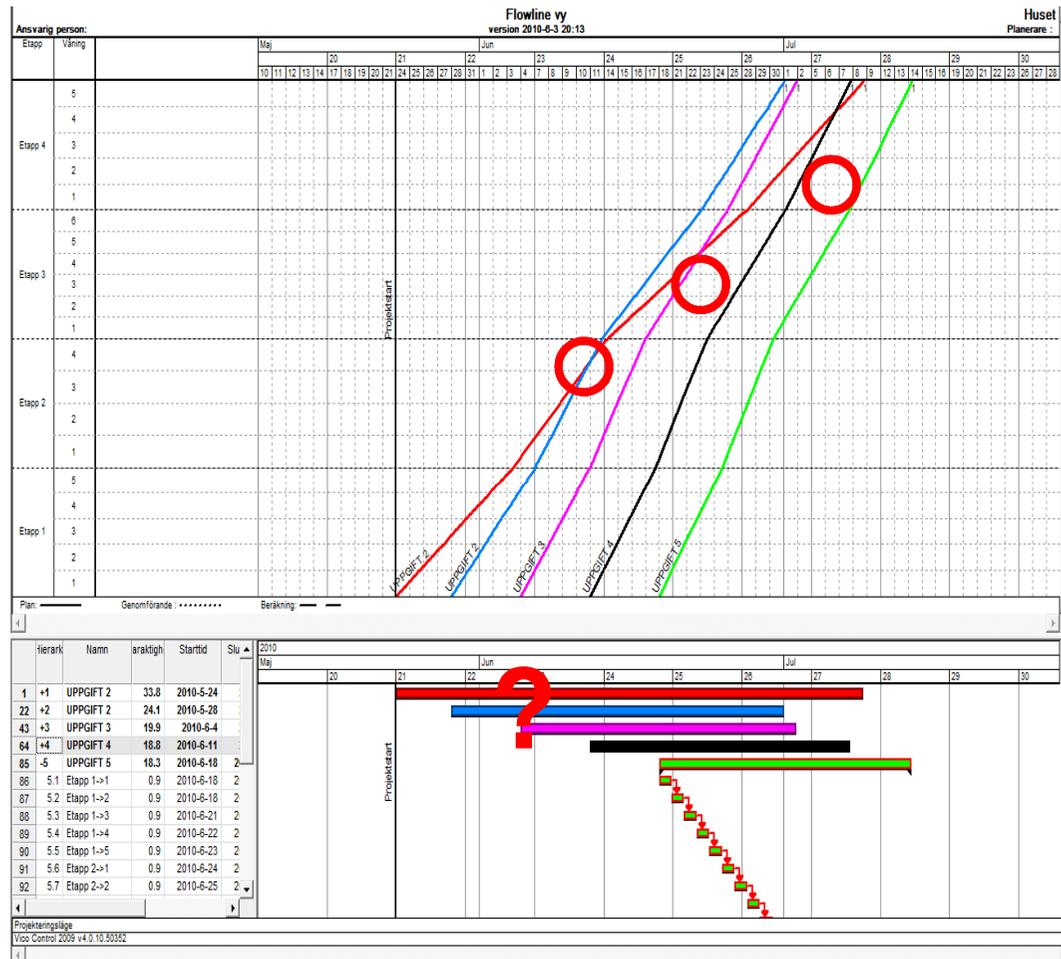
LINEA DE BALANCE



De Gantt a Líneas de Flujo

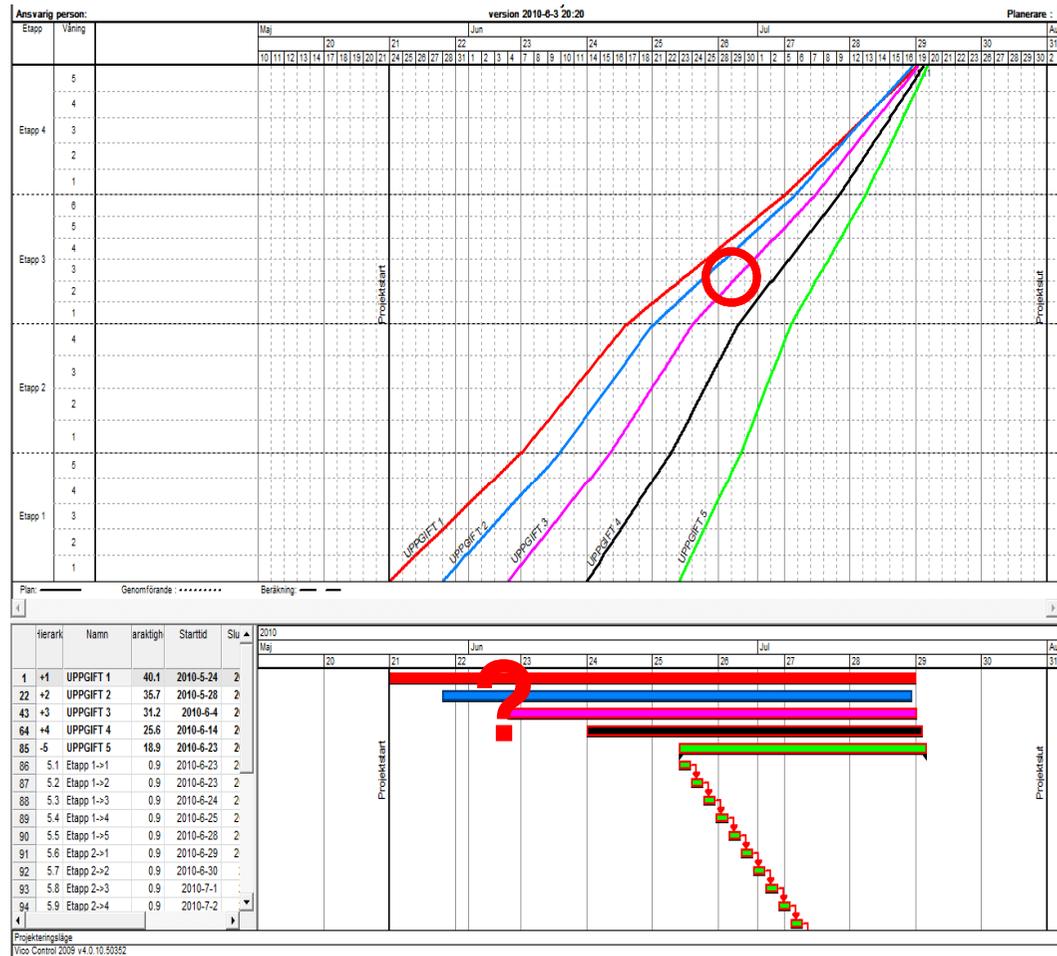


Intersecciones...



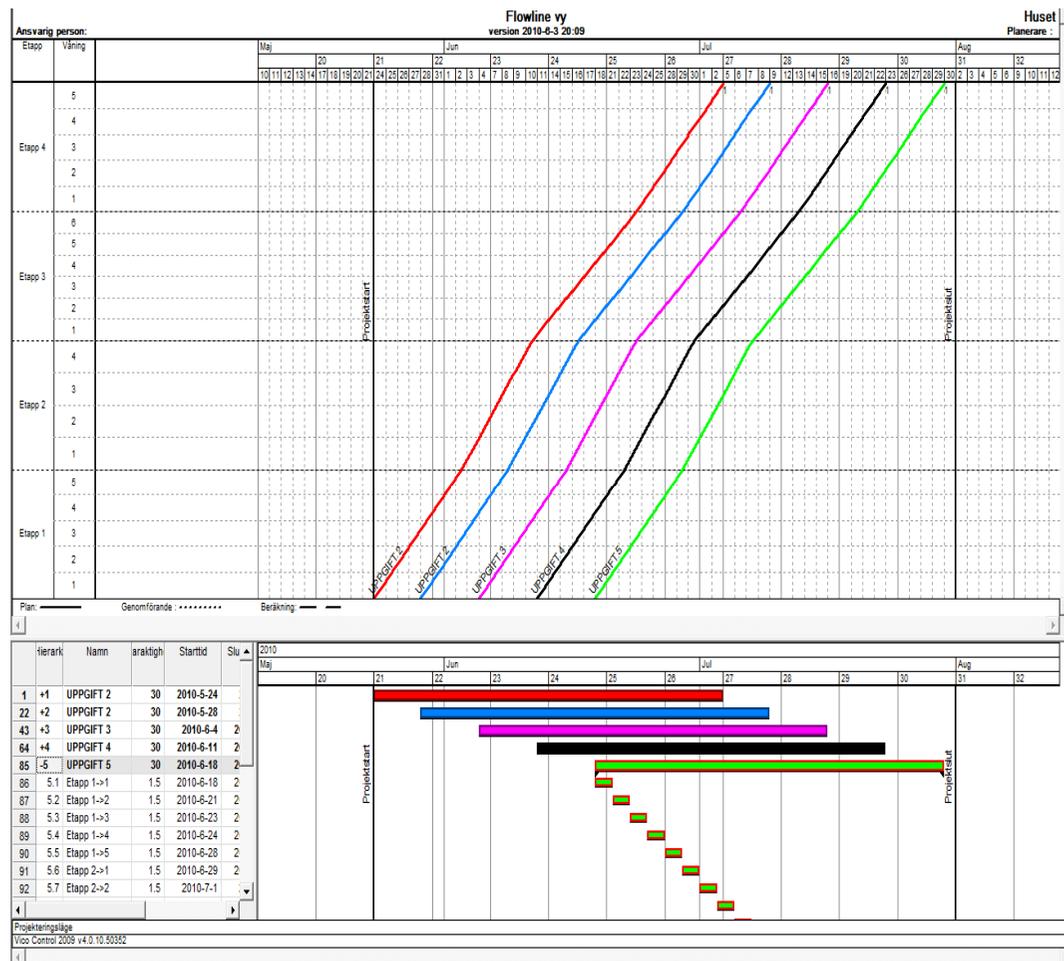
- Visuales
- Anticipése a los imprevistos
- Datos en Gantt: inicio, final, duración...

Riesgos...



- El índice de producción puede variar
- El riesgo aumenta a medida que avanza el proyecto
- También se visualiza en un Gantt, pero cuando el riesgo aumenta es más fácil de ver en las Líneas de flujo

Planificación óptima...



- Flujo de trabajo consistente
- Provisión y envío de recursos consistente
- Riesgos bajos
- Previsión real de tiempos para imprevistos

Gracias por su atención...

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