

## Visão da Trimble

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# Trimble atua em todo ciclo de vida do empreendimento



# Trimble atua em todo ciclo de vida do empreendimento

CONCEPÇÃO

PROJETO

QUANTITATIVO

PLANEJAMENTO

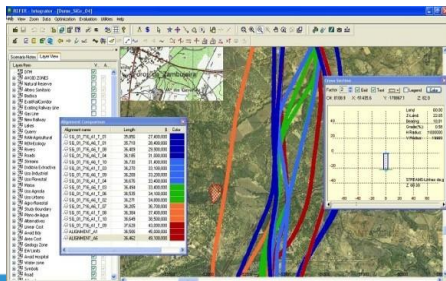
CONSTRUÇÃO

OPERAÇÃO

## Tecnologia de posicionamento e controle de máquinas



## (BIM) Building information management software



Produtividade da máquinas

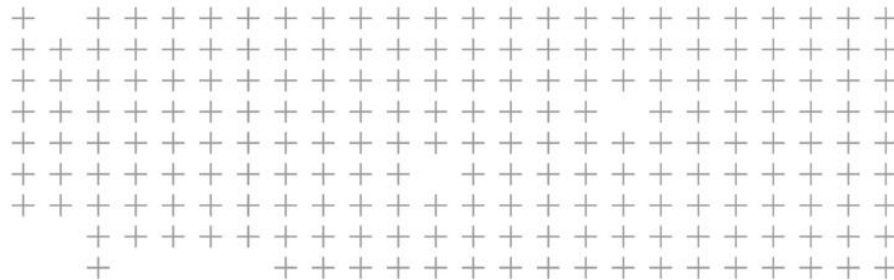
**30%+**

Redução de Retrabalho

**50%+**

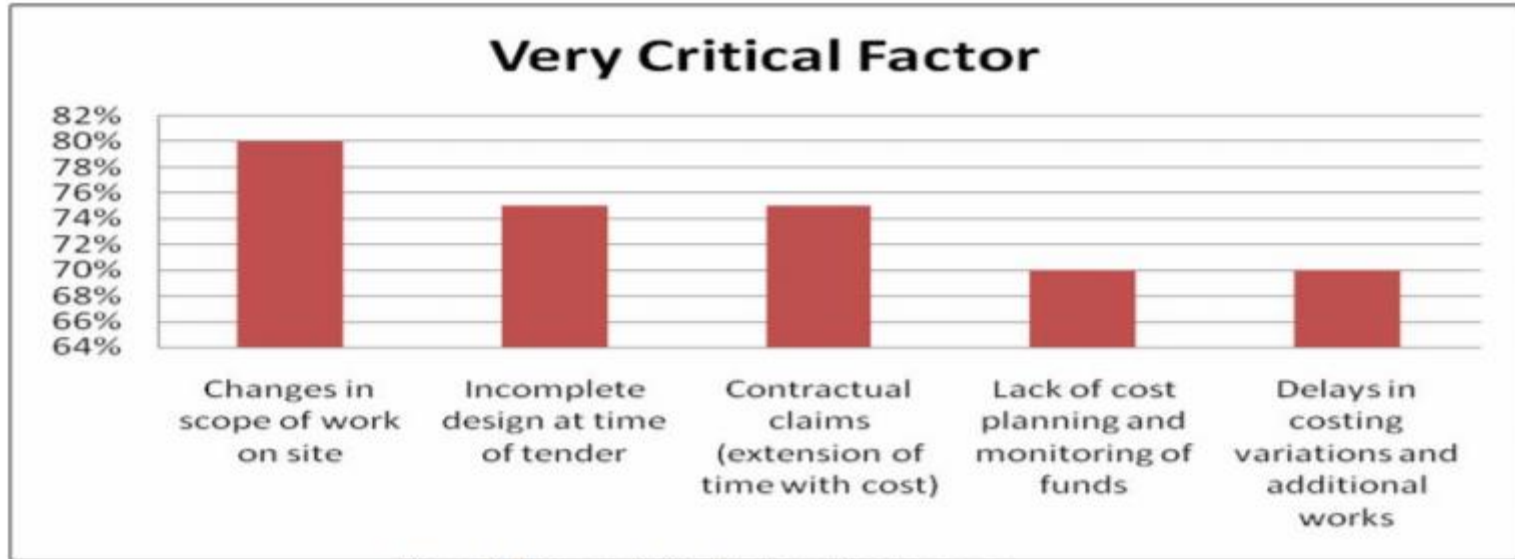
GANHOS NO CUSTO TOTAL DOS PROJETOS

**Em até 30%**



# Importância do BIM

# Fatores críticos para exceder o Budget



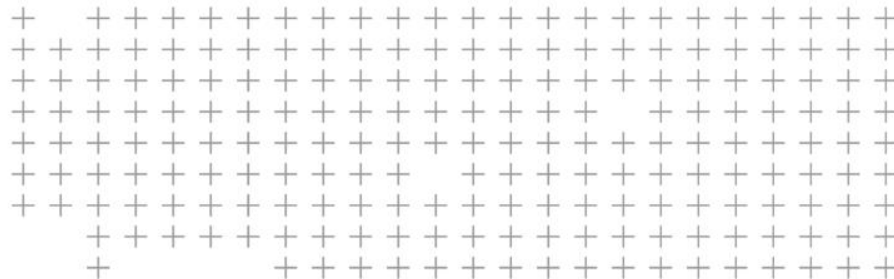
**Figure 2: Five very Critical Factors of cost overruns**

Source: [http://www.irbnet.de/daten/iconda/CIB\\_DC22746.pdf](http://www.irbnet.de/daten/iconda/CIB_DC22746.pdf) - Proceedings 5th Built Environment Conference 18-20 July 2010 Factors contributing to cost overruns of construction projects Durban South Africa ISBN: 978-0-620-46703-2

# Pequenos erros...







## Fatores críticos



**Alterações de escopo**

**Desenhos incompletos e/ou inexatos**

**Quantitativos = atrasos no cronograma + variações custo + aditivos contratuais**

**Comunicação entre as partes**

# Importância do BIM: Construir conforme projetado, gerando documentação rica em detalhes precisos, que facilite a operação e manutenção



X



Planejar, projetar,  
construir

OPERAÇÃO E MANUTENÇÃO

## Ciclo de vida (duração em anos)



**CUSTOS DE  
OPERAÇÃO E  
MANUTENÇÃO  
=  
80% DOS  
CUSTOS TOTAIS**

Estudo de  
Viabilidade

Topografia

Planejamento  
e Projeto

Estimativa

Fabricação

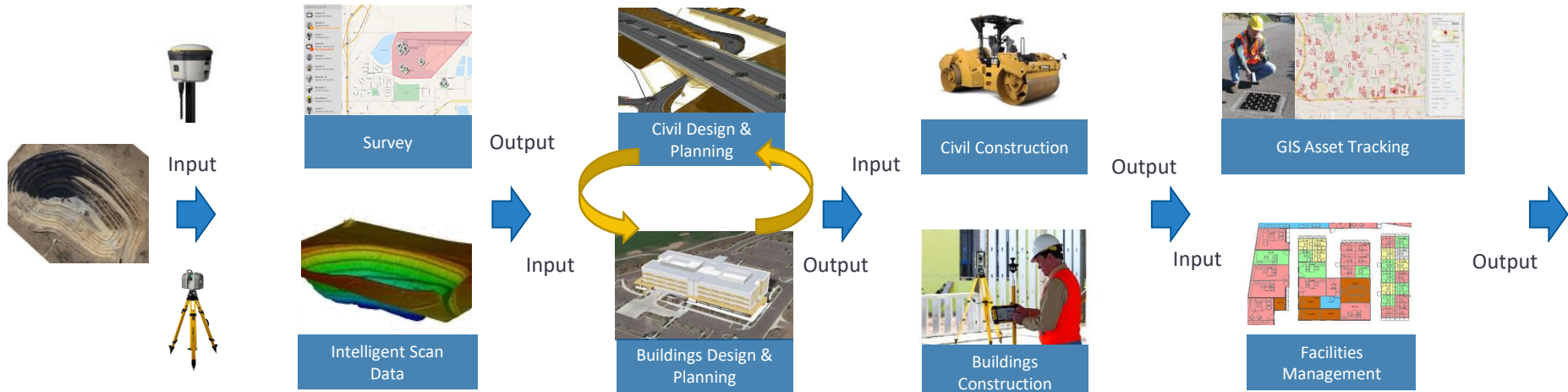
Construção

Operação e  
Manutenção





# Fluxo de Trabalho baseado em dados digitais



O Real:  
**Mundo existente**

O virtual:  
**Mundo Existente**

O virtual:  
**Mundo Futuro**

Do virtual:  
**Mundo Futuro ao  
real  
Mundo Existente**

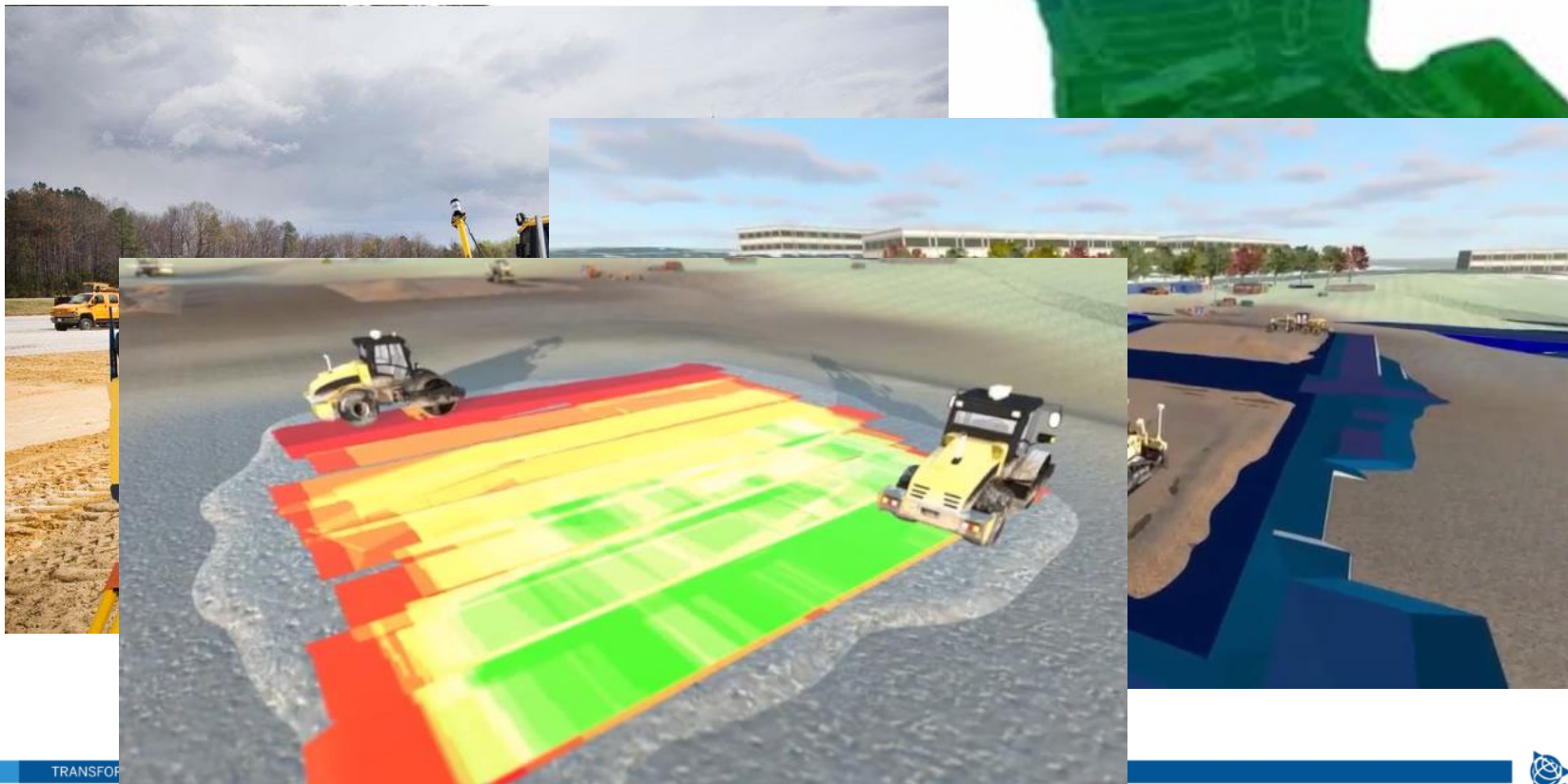
Do atualizado:  
**Mundo Futuro ao  
real  
Mundo Existente**

Planejar

Construir

Operar

# Preparação do Terreno

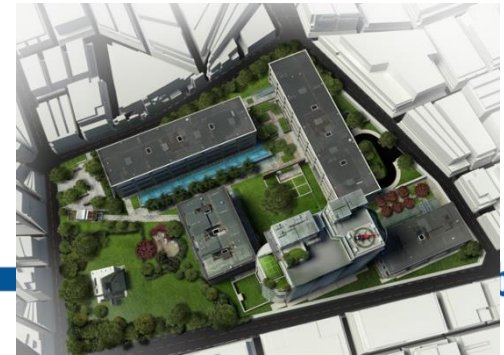


TRANSFOR



# Trimble SketchUp

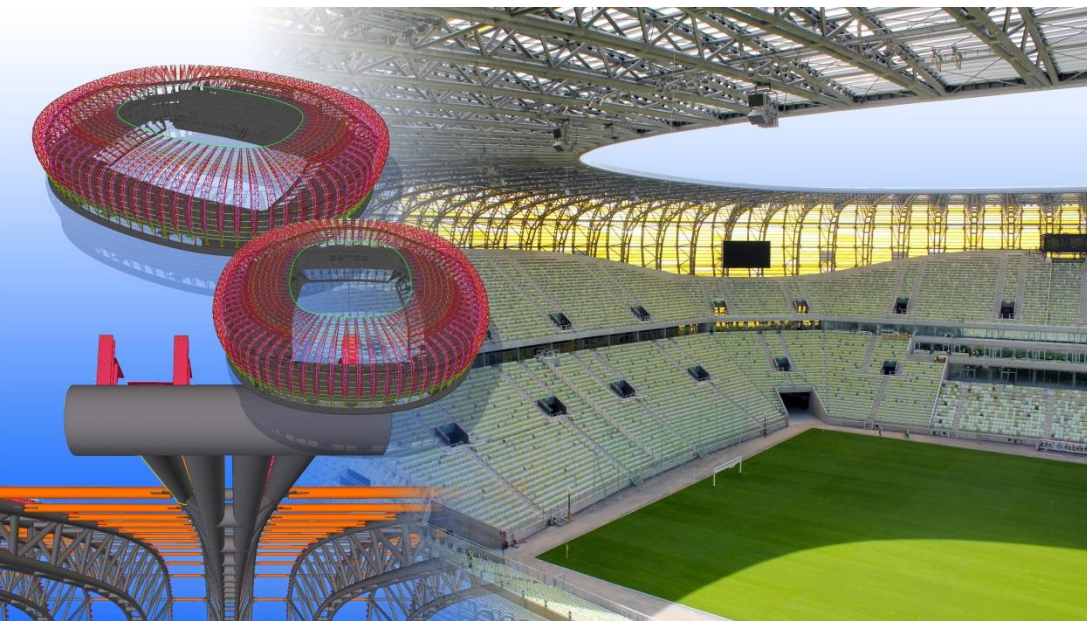
World's leading design tool for architecture.



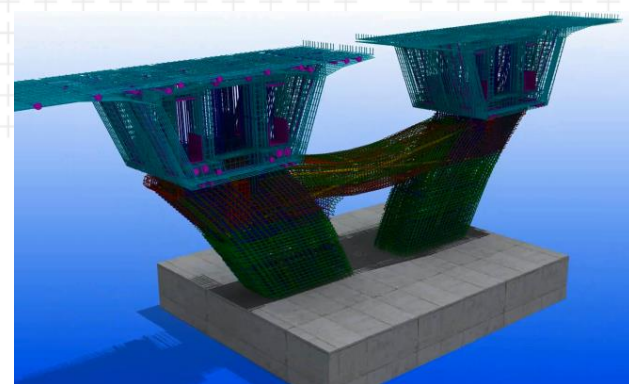




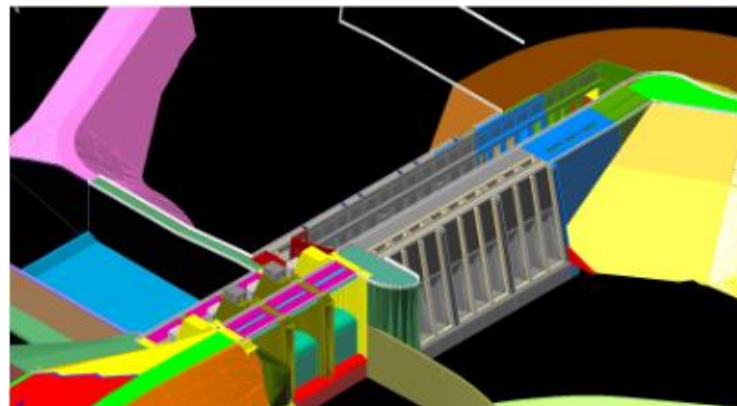
# Tekla Soluções para as áreas



Estruturas Metálicas



Engenharia Estrutural

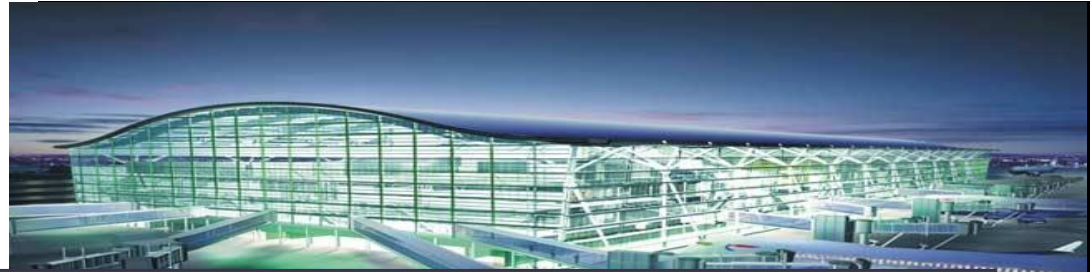


Concreto Armado: Pré Moldado e Moldado em Loco

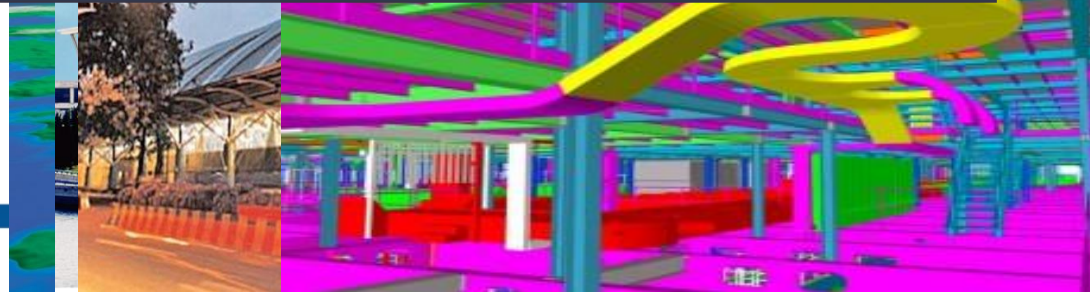
# Modelos estruturais



- Avinor, OSLO, NO
- Bergen, NO
- Chennai Airport Expansion, IN
- Mumbai Domestic Terminal, IN
- Salalah Airport, Oman
- Bali International Terminal, ID
- Denver Expansion, US
- Abu Dhabi Midfield Expansion, UAE
- Pudong International Terminal, CN
- Amritsar Airport Terminal, IN
- Heathrow T2A, T2B, UK
- Gatwick Airport, UK
- Stanstead Airport, CA
- Dublin Airport, IE
- Dubai International T3, UAE
- Doha, Qatar



Grande parte dos projetos de aeroportos novos e expandidos foram modelados no software Tekla Structures





# Orçamentação, Gerenciamento, Planejamento e Cronograma:

## VICO OFFICE – BIM 5D

The screenshot displays the VICO OFFICE BIM 5D software interface. The top toolbar includes various navigation and editing tools. The main workspace is divided into three sections:

- 3D View:** Shows a 3D model of a building structure with columns and slabs. A blue circle with the number '1' is overlaid on the model with the text "Elements provide geometry".
- Table View:** A table showing quantities for various elements. A blue circle with the number '2' is overlaid on the table with the text "Quantities calculated automatically".
- Cost Plan Table:** A table showing the cost plan for the project. A blue circle with the number '3' is overlaid on the table with the text "Model based quantities drive cost plan".

The table in the middle section (Table View) has the following data:

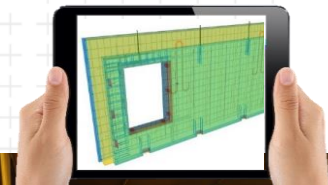
Info	Code	Description	Unit	Value
		Quantity		
		A1012_003_Pile Cap-ID	(49)	
		A1021_001_CIP RC Pile-ID	(196)	
		A1031_001_Slab on Grade-ID	(1)	
		B1012_005_CIP RC Slab-ID	(9)	
		B1012_025_CIP RC Wall-ID	(6)	
		B1012_034_CIP RC Column-ID	(168)	
		B1011_009_CIP RC Beam-ID	(196)	
		B2011_040_Ext Metal Wall Panel-B2021_020-ID	(398)	
		B2011_010_Ext Metal Wall Panel-031-ID	(2)	
		B2011_010_Ext Metal Wall Panel-ID	(40)	
		B2022_010_Ext Glazing System, clear-ID	(4)	

The table in the bottom section (Cost Plan Table) has the following data:

Code	Description	Source Qty	Consumption	Waste	Qty	UOM	Unit Cost	CostPar..	Net Total	%/Parent..
000	VICO OFFICE PROJECT	15,000.0	1,000	1,000	15,000.0	SF	215.38	N/A	3,230,740.85	N/A
A	SUBSTRUCTURE	15,000.0	1,000	1,000	15,000.0	SF	18.38	18.38 / SF	275,740.85	8.53 %
[0]	Piles	196.0	1,000	1,000	196.0	EA	1,000.00	13.07 / SF	196,000.00	71.08 %
[1]	Pile Caps	68.1	1,000	1,000	68.1	CY	450.00	2.04 / SF	30,625.01	11.11 %
[2]	Slab on Grade	9,823.2	1,000	1,000	9,823.2	SF	5.00	3.27 / SF	49,115.84	17.81 %
B	SHELL	15,000.0	1,000	1,000	15,000.0	SF	65.00	65.00 / SF	975,000.00	30.18 %
C	INTERIORS	15,000.0	1,000	1,000	15,000.0	SF	32.00	32.00 / SF	480,000.00	14.86 %
D	SERVICES	15,000.0	1,000	1,000	15,000.0	SF	100.00	100.00 / SF	1,500,000.00	46.43 %
Z	ALLO...	15,000.0	1,000	1,000	15,000.0	SF	0.00	0.00 / SF	0.00	0.00 %

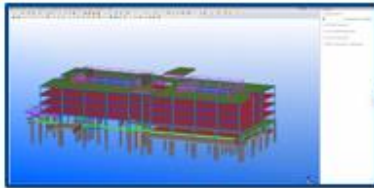
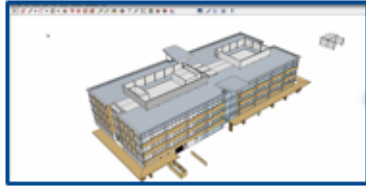
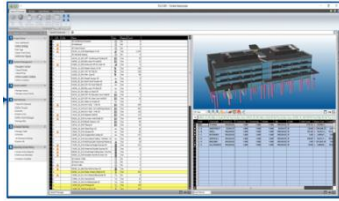


# TRABALHO EM EQUIPE EFICIENTE



Trimble Connect

# BIM → Canteiro → BIM



## Trimble Connect



**VICO** SOFTWARE  
Integrating Construction

**SketchUp**

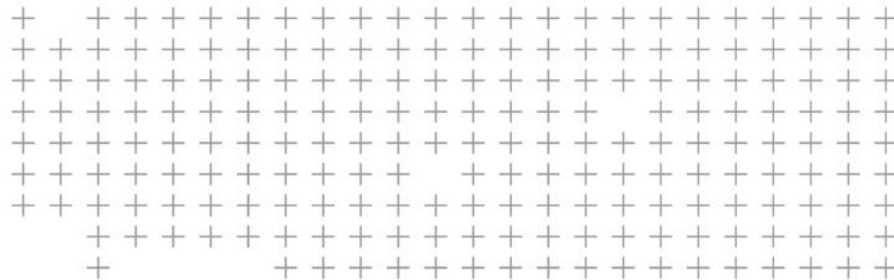


**Tekla**



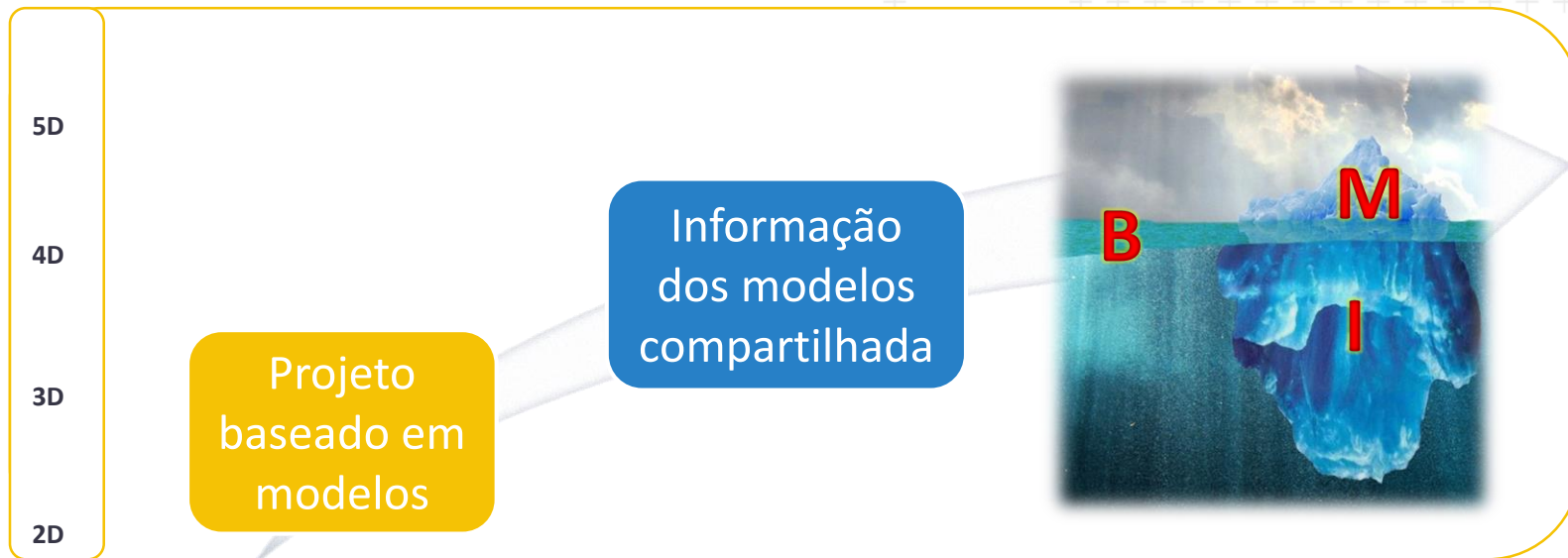
**Trimble MEPdesigner**





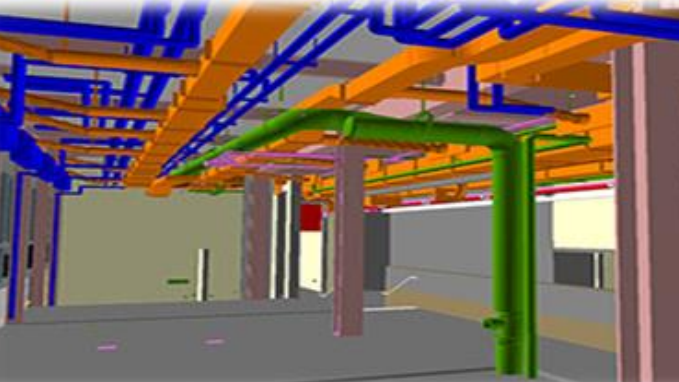
**Condições inesperadas no canteiro?**

# FASES DO BIM





# Do BIM ao Canteiro de Obras



# Verifique se o piso está plano

Trimble Field Link: 2nd Floor Flatness Verification

VIEW 106

Surface: A.5-5.4

Reference Elevation: 113' 6"

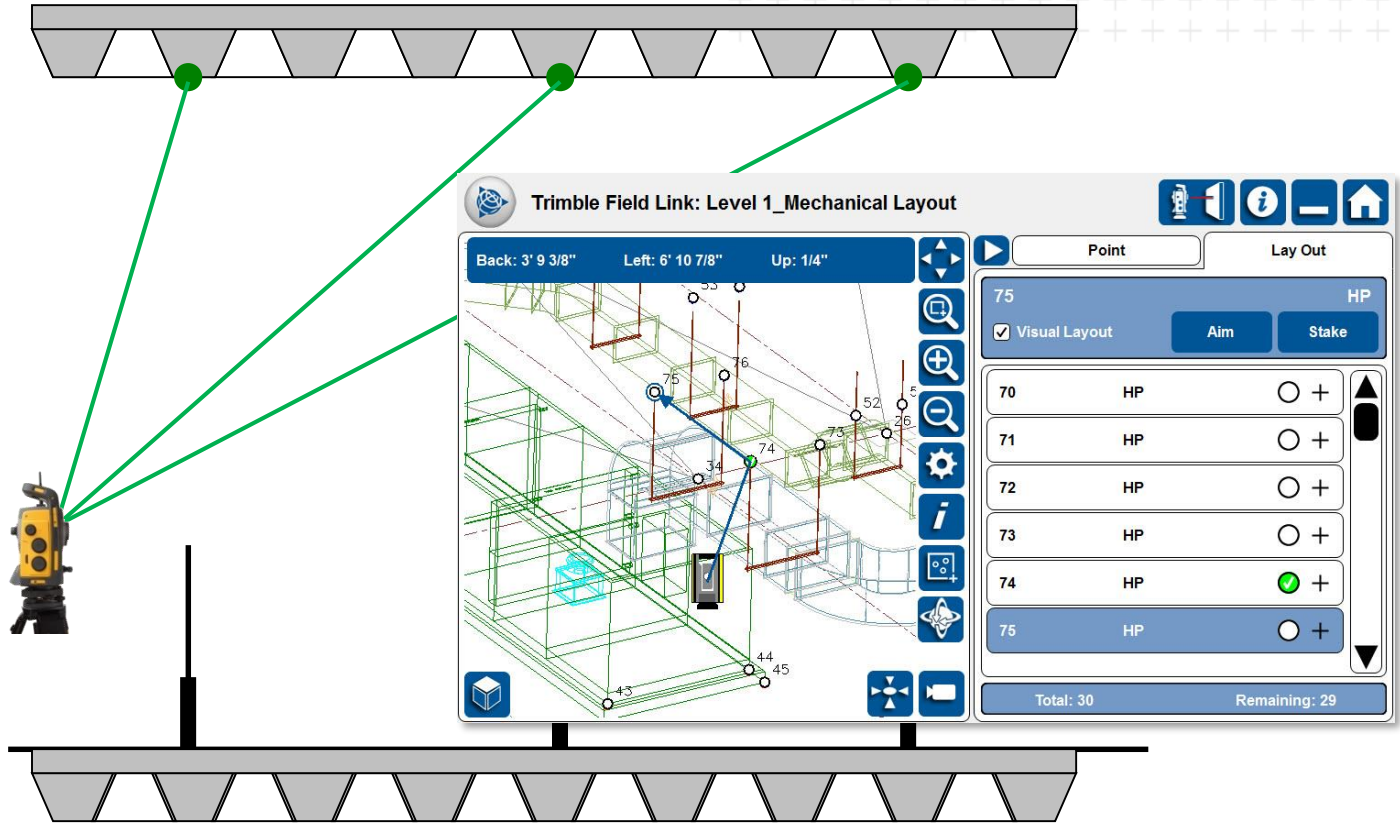
Shoot

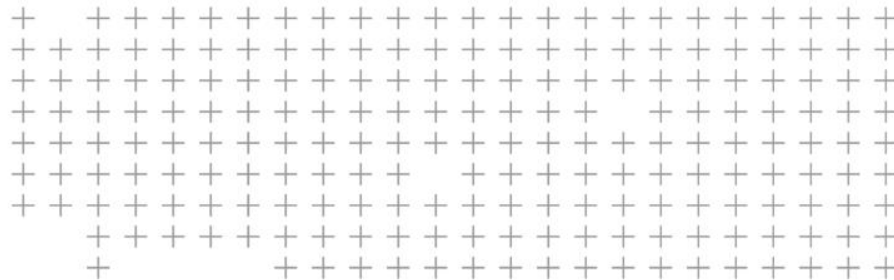
Tolerance: 1/4"

Save



# Trimble Field Link for MEP





## Operação e Manutenção



**Ampliar ou reformar?**

# Projeto Hemosc – Nuvem de Pontos





# Projeto Hemosc – Nuvem de Pontos





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<http://www.sketchup.com/products/sketchup-make>

<https://campus.tekla.com/download>

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

<http://connect.trimble.com/>

Trimble Connect Videos: <https://www.youtube.com/playlist?list=PLUO6j5jr1rwvtMRsglew3DzBzsgaSFAjK>

Trimble Connect Desktop Videos:

<https://www.youtube.com/playlist?list=PLUO6j5jr1rwveBkF6sJ2JKMz9yCsqA5Wk>

[www.trimble.com.br](http://www.trimble.com.br)

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