



BIM

SAY “NO!” TO HOLLYWOOD BIM! DO IT WISELY!

An advanced integration of BIM in a company process

BY ANTÓNIO RUIVO MEIRELES

ndBIM
VIRTUAL BUILDING



TOPICS:

ABOUT US

THE 7 BENEFITS

BIM IMPLEMENTATION STRATEGY

ABOUT US

REASON FOR OUR EXISTENCE

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

**In times of change, learners
inherit the Earth. . .**

while the learned
find themselves
beautifully
equipped to deal
with a world that
no longer exists.

Eric Hoffer



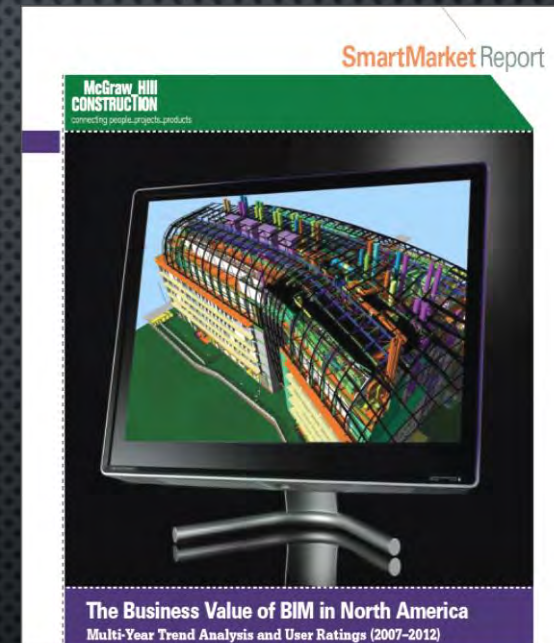
REASON FOR OUR EXISTENCE

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

5D Models with Cost

Universally viewed as difficult, the integration of BIM models with schedule and cost data is one of the great promises of BIM. But at this point, even the very high E-Level users are cautious, with only 8% believing it is easy or very easy. However, the seamless integration of geometry with schedule and cost data has the potential to be a fundamental value proposition of BIM in the future if its difficulty can be surmounted.



ABOUT US

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

ndBIM

VIRTUAL BUILDING

Consulting and Services company specialized in **BIM** methodology (...)

(...) composed by professionals, Architects e Engineers, (...)

(...) with **over 7 years of BIM Implementation in the field.**

We believe that the migration process for 5D BIM (includes 3D and 4D) can be **achieved quickly and without risk** when it is carried in an oriented manner.

We know the industry, how the companies operate, their addictions, (...)

Our knowledge is not theoretical or was obtained from standard training of software houses, **it was on the other hand created from the knowledge gained from the Implementation of BIM in a construction company with an international dimension.**

ANTÓNIO RUIVO MEIRELES

FOUNDER OF NDBIM VIRTUAL BUILDING



- **BIMFórum Portugal Coordinator**
- **Guest Speaker at several international conferences BIM**
(Portugal, Italy, Paris, Holland, Hungary, Japan, Brazil, Norway, Denmark etc.) and participation in workshops (Finland, EUA, etc.)
- **Mentor of several BIM related master thesis**
- **Visiting professor of the course: "BIM: Concept, Design and Construction"** in the Master of Sustainable Construction and Rehabilitation, School of Engineering, University of Minho

Academic path:

- **Construction Management PhD (in progress)** at the Faculty of Engineering of the University of Porto (FEUP)
- **Business Management MBA** by IESF
- **Civil Engineering Degree** by the Faculty of Engineering of the University of Porto (FEUP)

Professional path:

- **BIM MANAGER** AT MOTA-ENGIL ENGINEERING
- **FOUNDER AND EX-COORDINATOR OF GTBIM** OF THE PORTUGUESE TECHNOLOGICAL CONSTRUCTION PLATFORM
- **INOVATION DEPARTMENT COORDINATOR** AT MOTA-ENGIL ENGINEERING
- **ENGINEER DESIGNER** STRUCTURES AND OTHER DISCIPLINES
- **IT STRATEGICAL CONSULTANT**

WHAT DO WE OFFER?

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

Diagnosis

Studies on the potential Return
on Investment (ROI)

**Definition of a Strategic
Implementation Plan**

Definition of Work

Methodologies

Contracts preparation support
Training



CONSULTING



DESIGN

Urban Planning

Architecture Design

Interior Architecture

Stability and Foundations

MEP

3D Modeling

Coordination

Structural and Functional analysis

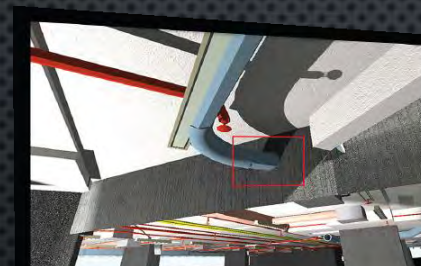
Clash Detection

Drawings Take off

Quantities Take off

3D Simulation

Renders and Animations



3D BIM - MODELING



4D BIM - SCHEDULING

Physical Scheduling

Physical Control

Physical Scheduling Forecast

4D Simulation

Estimating

Budgeting

Economic Control

Economic Forecast

5D Simulation



5D BIM - ESTIMATING



6D BIM - MAINTENANCE

Spaces Management

Assets Management

Tenant Management

Fault Management

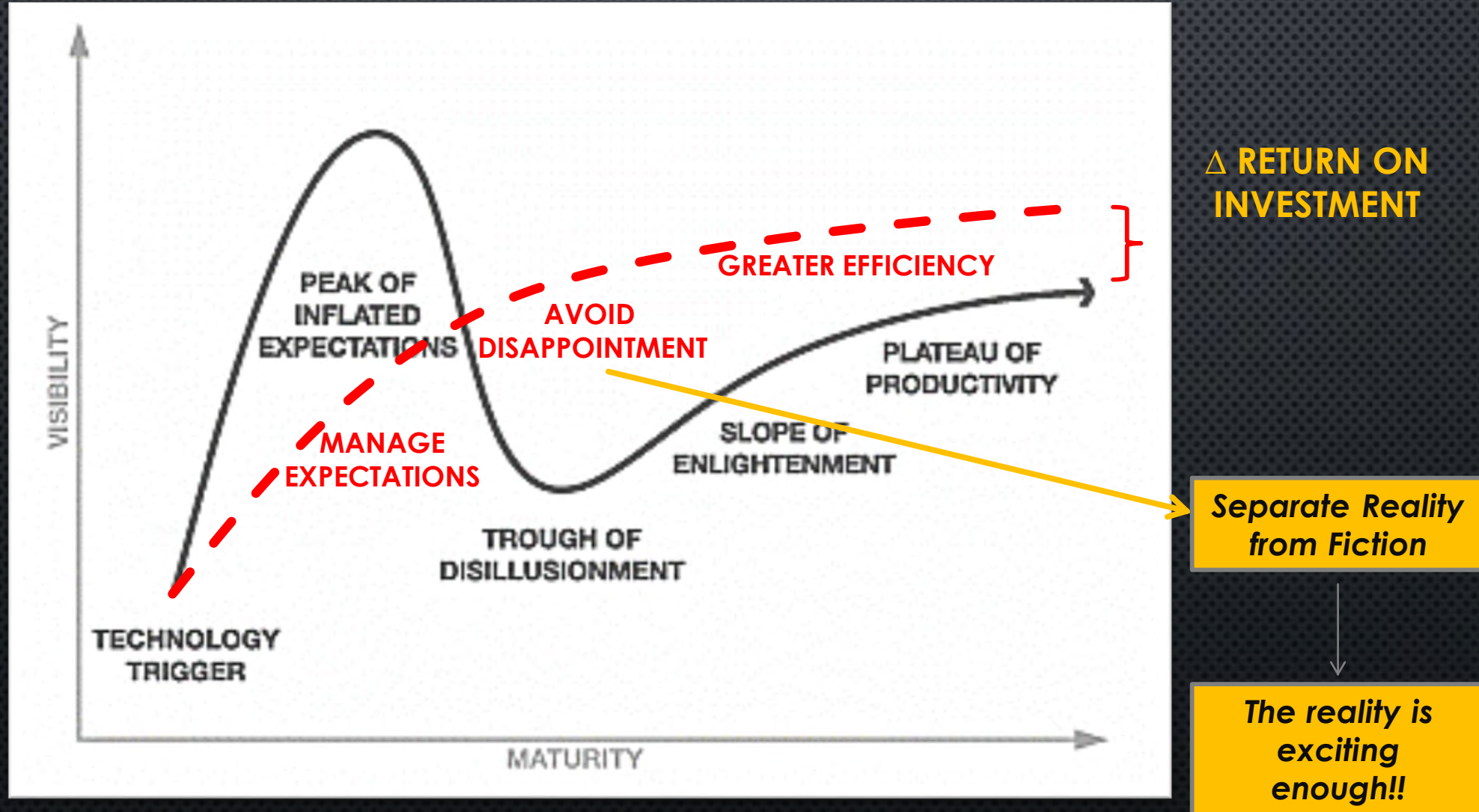
Preventive Maintenance

Reports

WHAT WE DO NOT OFFER?

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



Gartner Research's Hype Curve Model

WHERE ARE OUR CLIENTS?

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



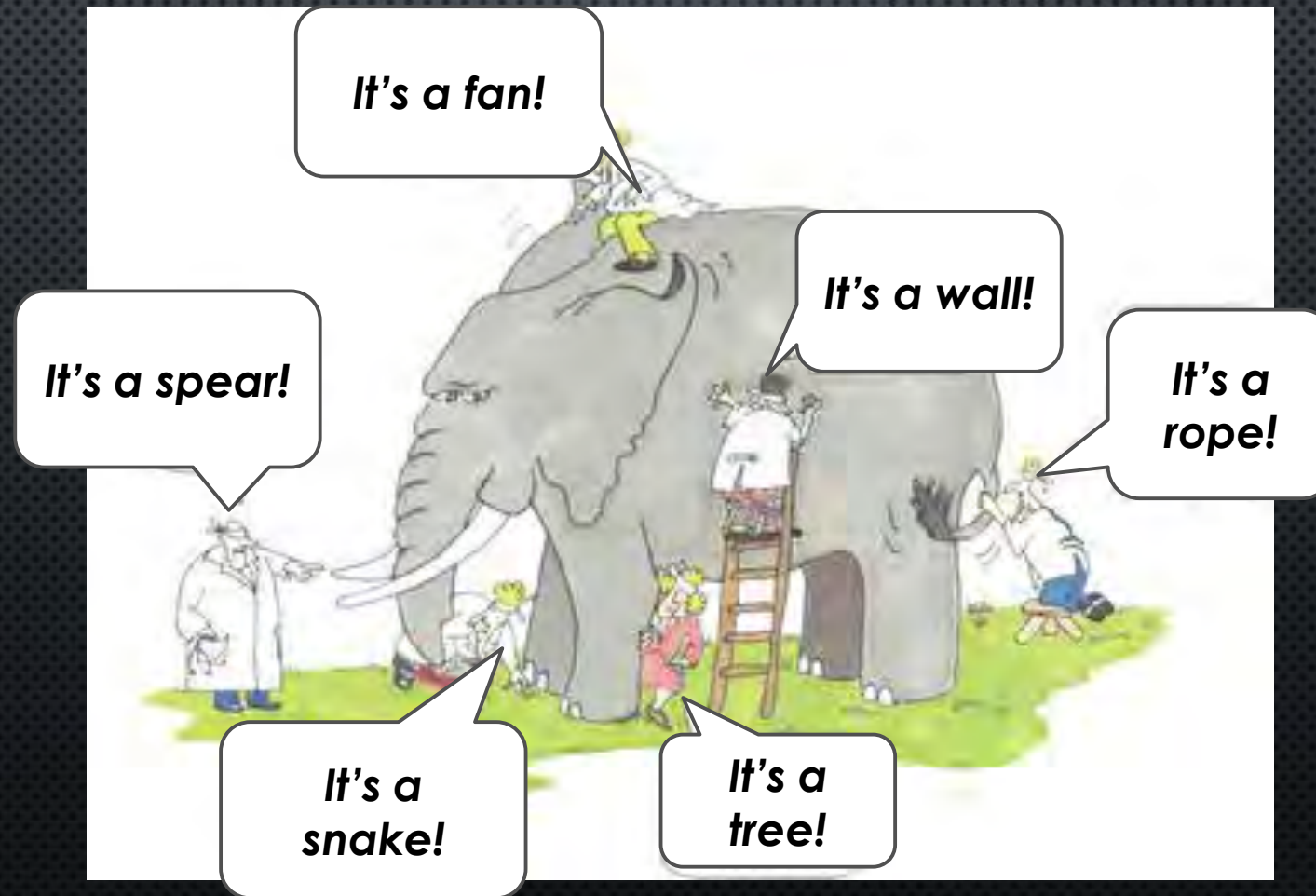
INTRODUCTION

INTRODUCTION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

THE IMPORTANCE OF DEFINING WHAT IS BIM



INTRODUCTION

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

The locals of Shinar decided to build a city that would touch the sky.

In consternation at their impertinence, God intervened, sowing discord and unease among men, depriving them of their original language.

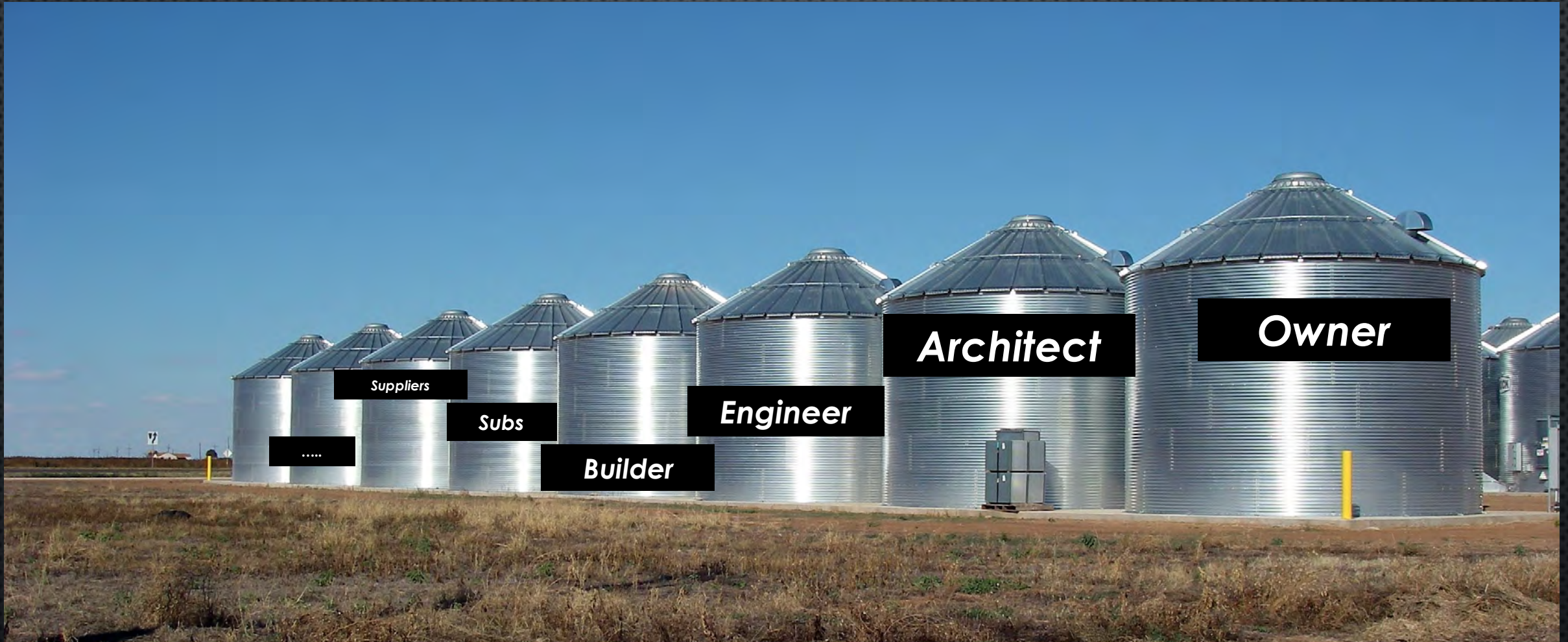
Culturally divided and unable to understand each other and join forces, the human nations have never been able to finish their major project which triggered a conflict.



INTRODUCTION

Say "No!" to Hollywood BIM! Do it wisely!

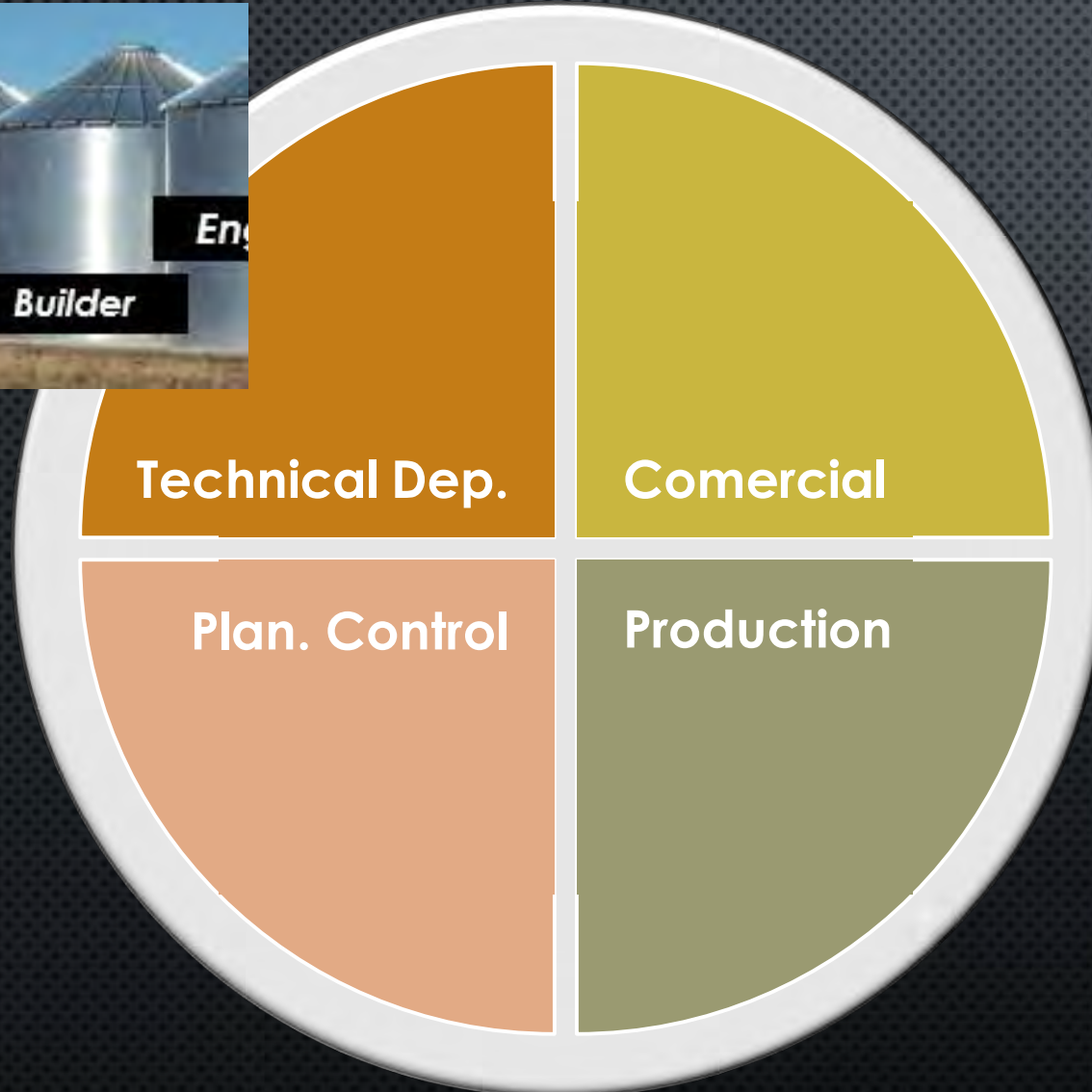
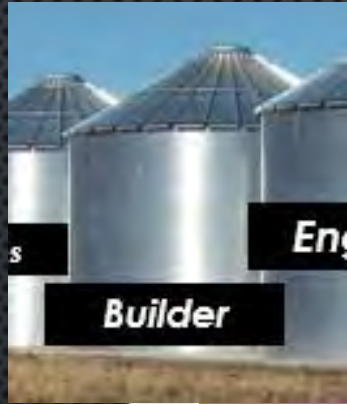
© 2014 António Ruivo Meireles ,
All Rights Reserved.



INTRODUCTION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



INTRODUCTION

Say “No!” to Hollywood BIM! Do it wisely!

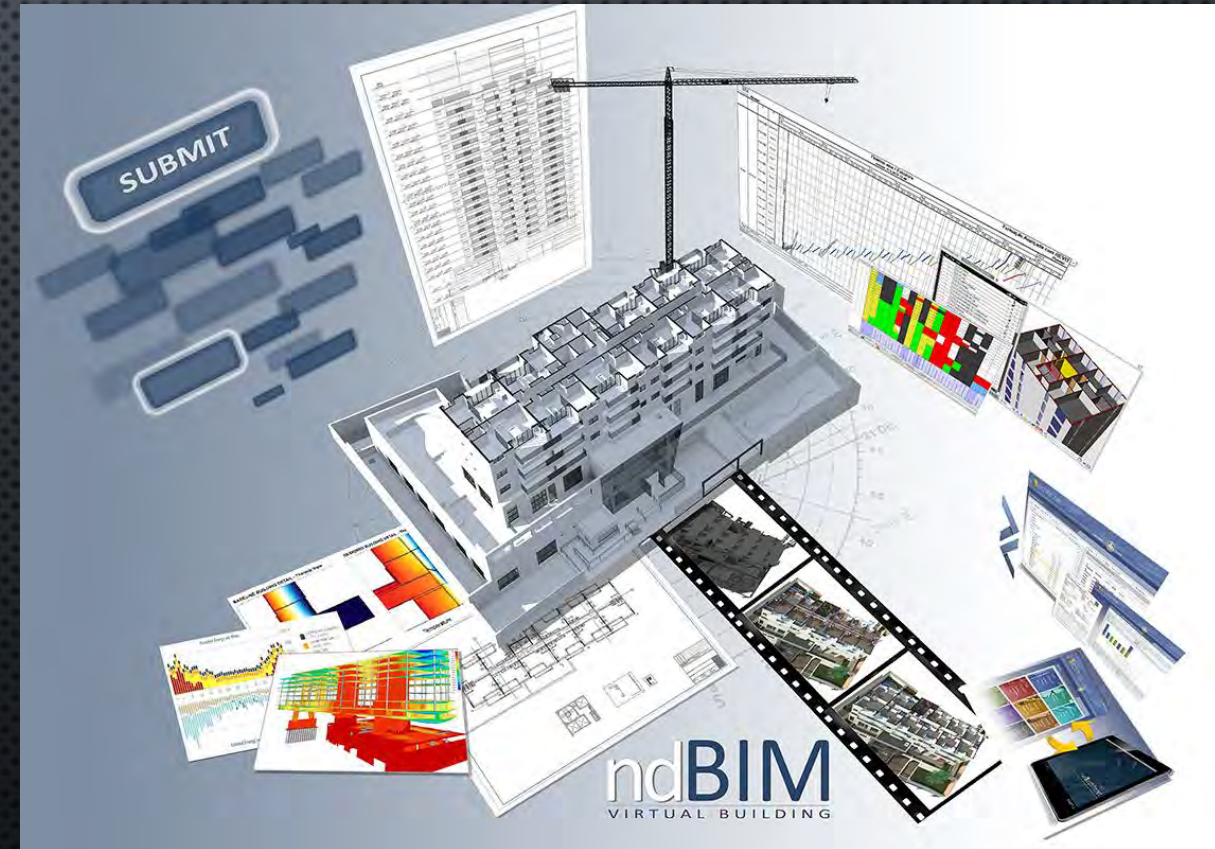
© 2014 António Ruivo Meireles ,
All Rights Reserved.

FOR US... WHAT IS BIM?

BIM is an integrated process that stores and streamlines the exchange of design, construction and operation information between the various stakeholders, ...

... creating three-dimensional models that represent all the physical and functional characteristics of the building ...

... that **have a great potential in supporting decision making in the various stages of a project.**



The 7 Benefits

1. Better Communication
2. Optimized Crews
3. Problem Identification and Resolution
4. Design Optimization
5. Shop Drawings
6. Quantity Extraction and Cost Estimation
7. Better scheduling

Summing up, more data to help decision making.

THE 7 BENEFITS

THE 7 BENEFITS

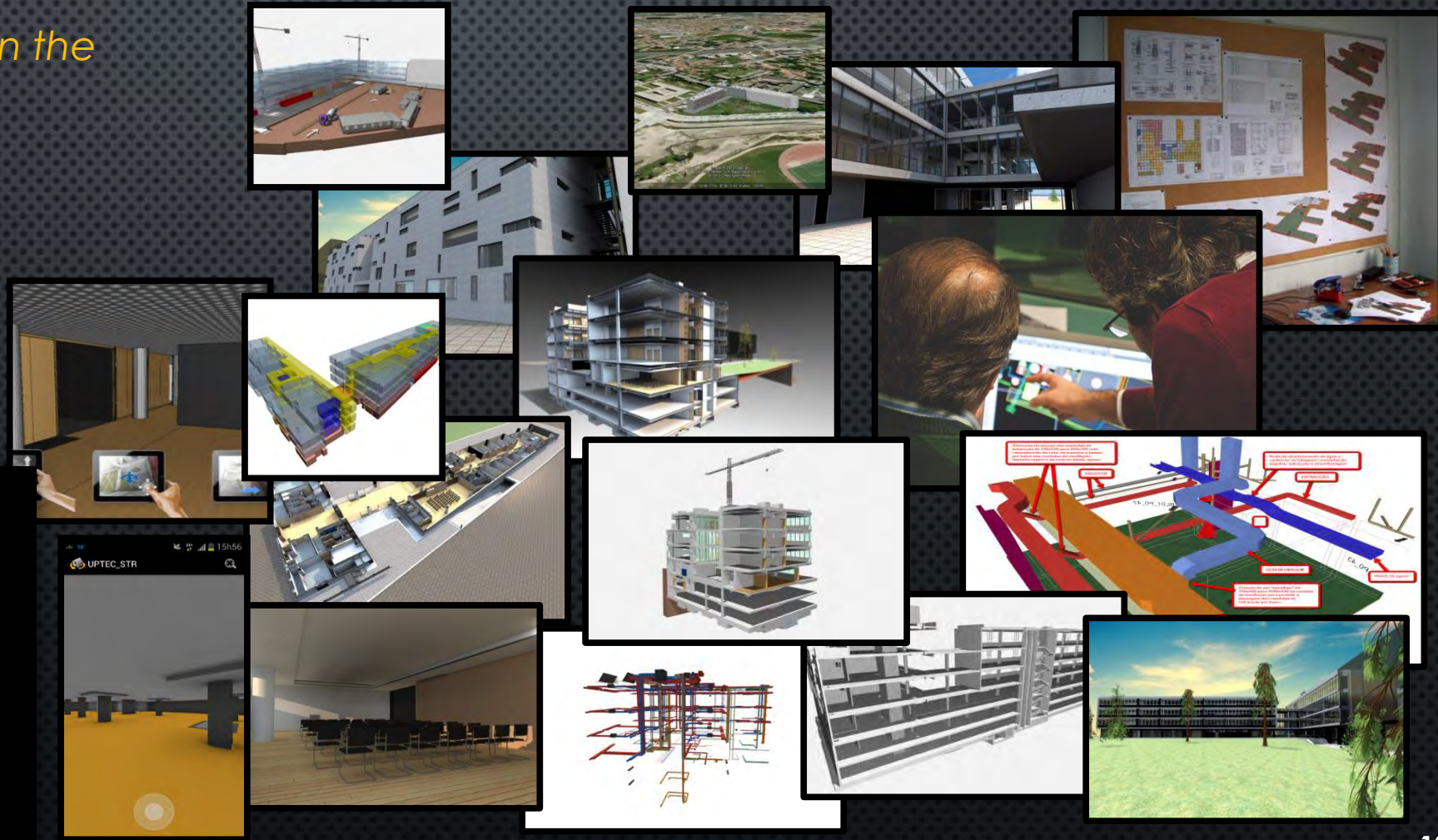
Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

(1) BETTER COMMUNICATION

Proven to be a **direct benefit on the communication**

- *Between departments;*
- *Sub-contractors;*
- *New personnel on-site;*
- *Clients.*



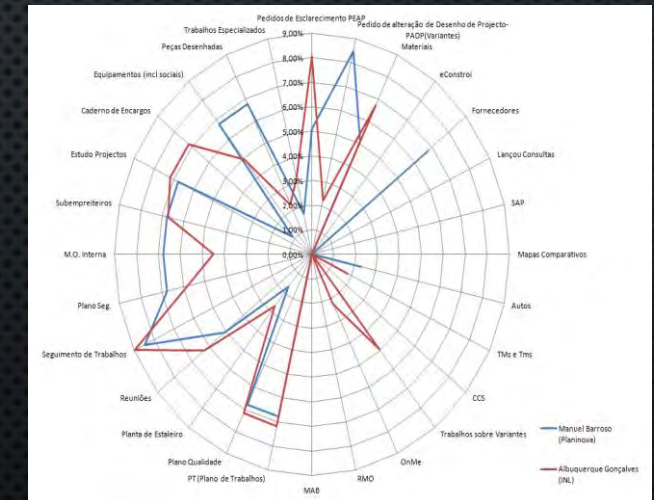
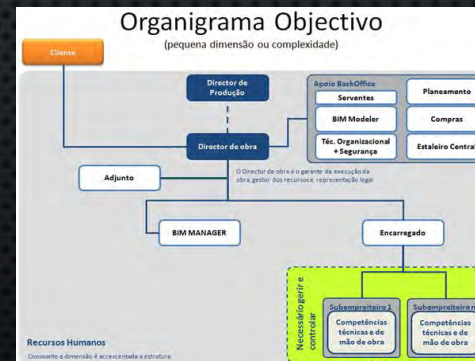
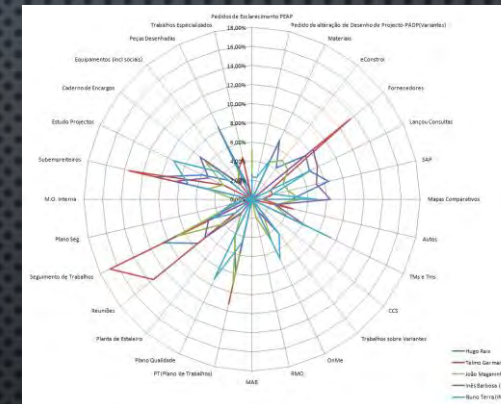
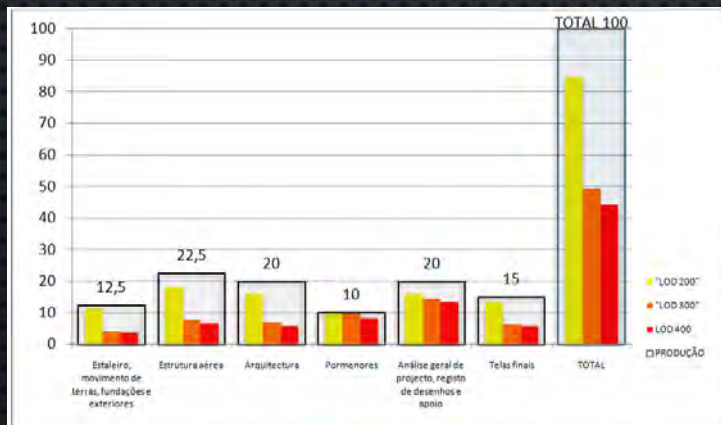
THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

(2) OPTIMIZED CREWS

- Our internal studies show that with a BIM Process we can have smaller teams in charge of the site;
- This can represent a saving of 1 to 2% of the costs on the project.**



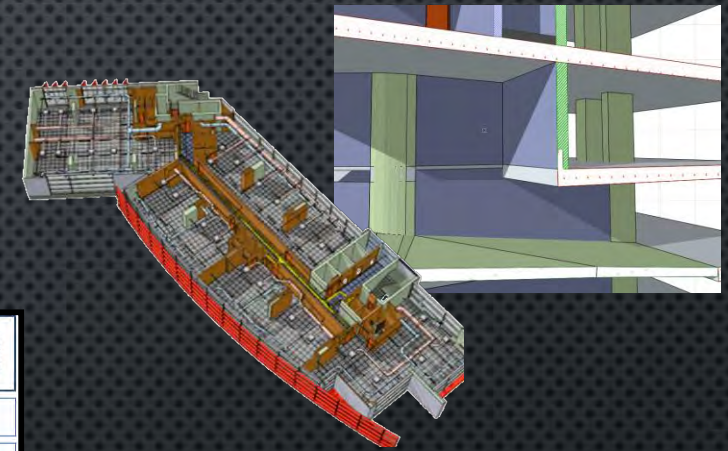
THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

(3) PROBLEM IDENTIFICATION AND RESOLUTION

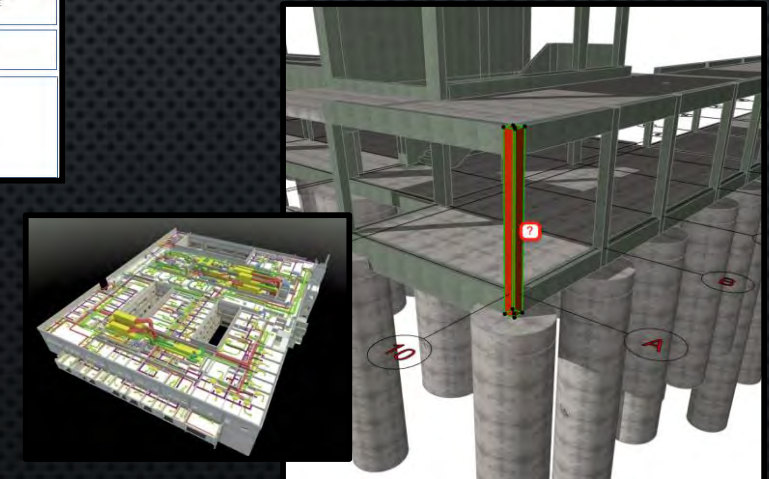
- Because of the deficient quality of the projects, there are always lots of problems.
- The ability to detect them beforehand has proven to be invaluable.
- **Aim to have a 80% rework economy.**



ID	Specialities	Floor	Axes	2D Drawings	Who find it?	Who should resolve it?	Severity	Resolved?
12	ARQ/ STR	-1	09-D	Cx.Esc.02	JM	ARQ		
A PORTA DE ACESSO A ÁREA TÉCNICA POR BAIXO DA ESCADA, ESTA DESIGNADA NA PLANTA DE ARQUITETURA COMO VIP01, CONTUDO QUER EM LARGURA COMO EM ALTURA PARECE INCOERENTE COM O EXISTENTE.								
NÃO SE PROCEDEU A QUALQUER ALTERAÇÃO. AGUARDA-SE PARECER DO PROJETISTA.								
Escadaria		C-399		VIP-01				



Resolução de Incompatibilidades



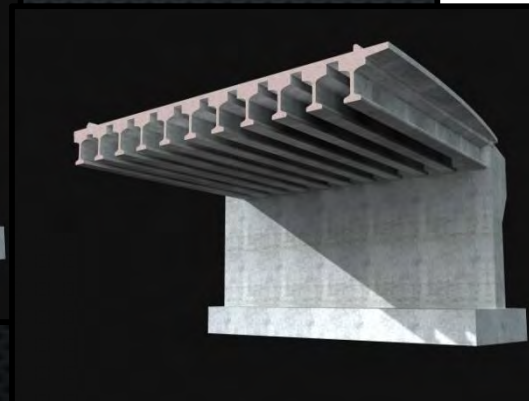
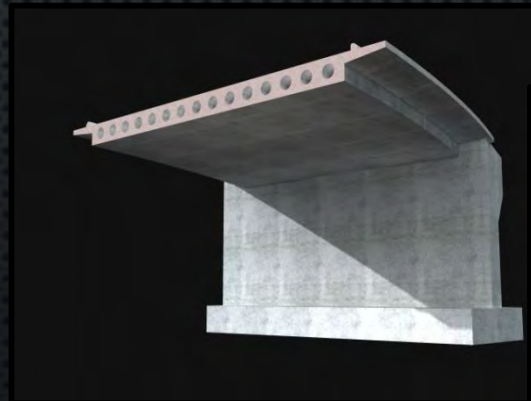
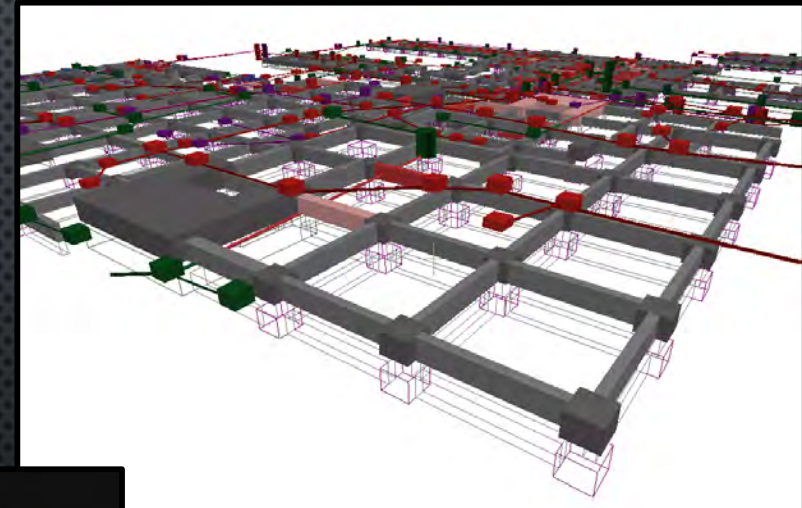
THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

(4) DESIGN OPTIMIZATION

- *Internationally there is a long standing tradition of GC presenting project alternatives to the client.*
- *The model clarifies the intentions.*
- **Our goal is to increase builders margin at least in 1%.**

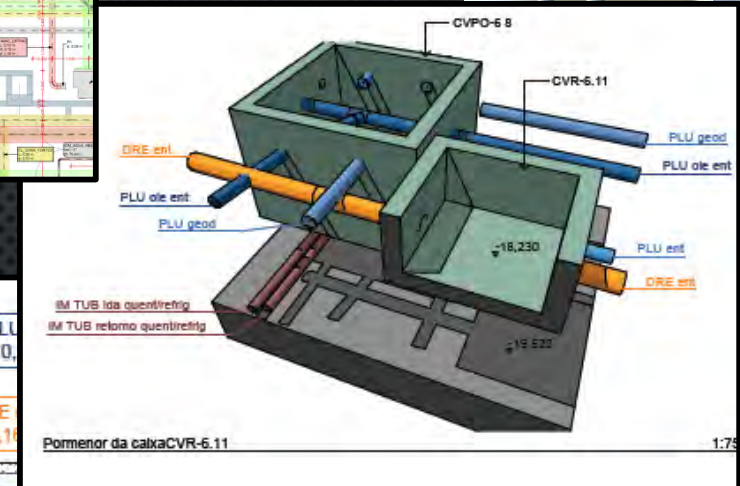
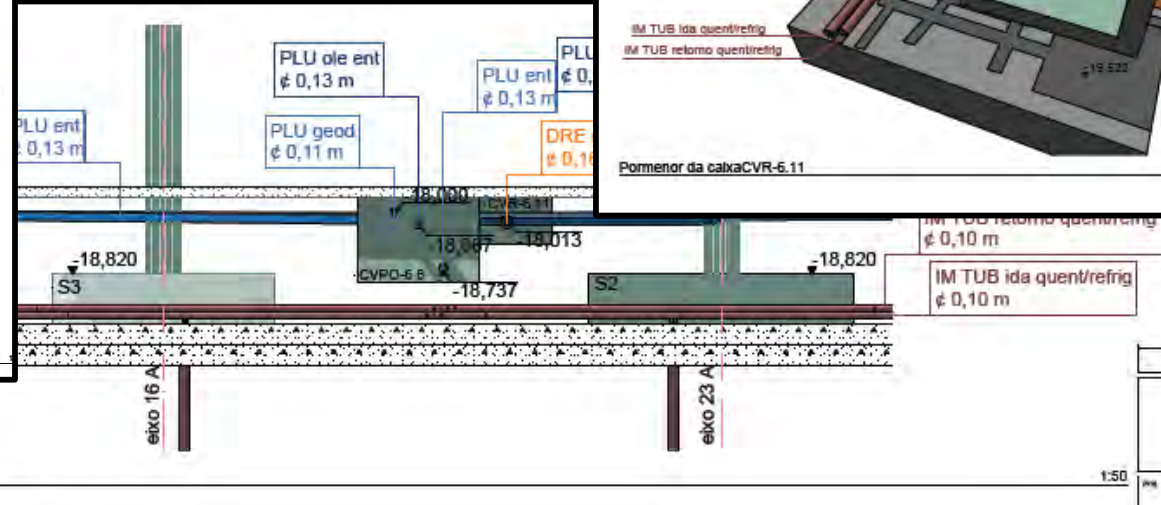
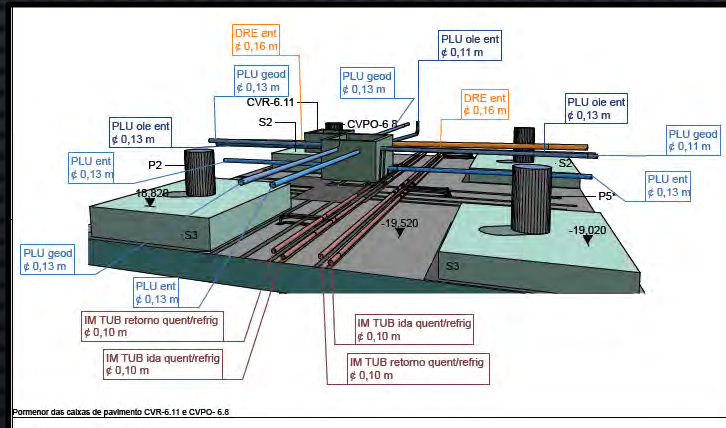
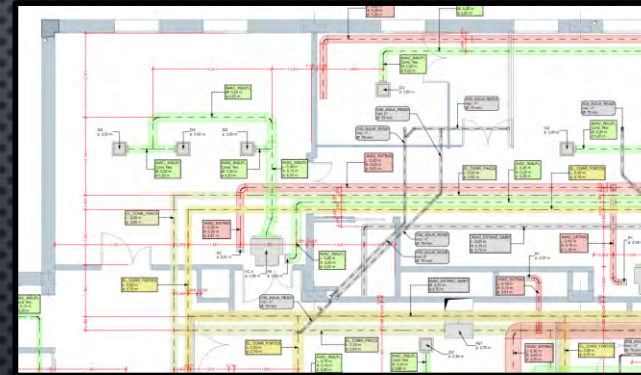
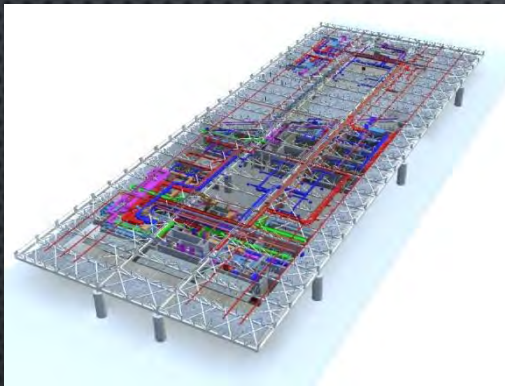


THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

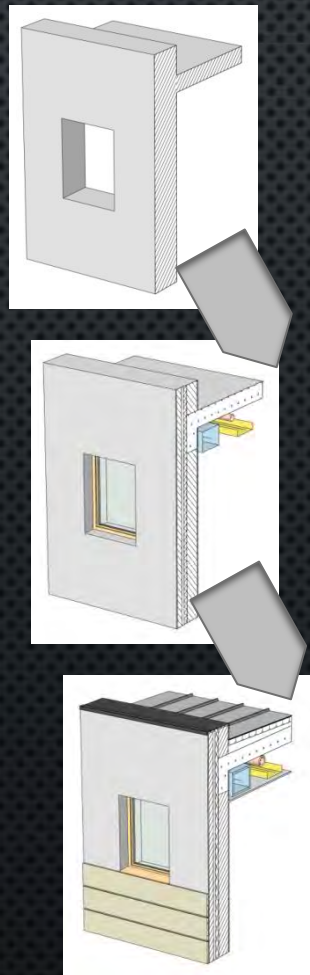
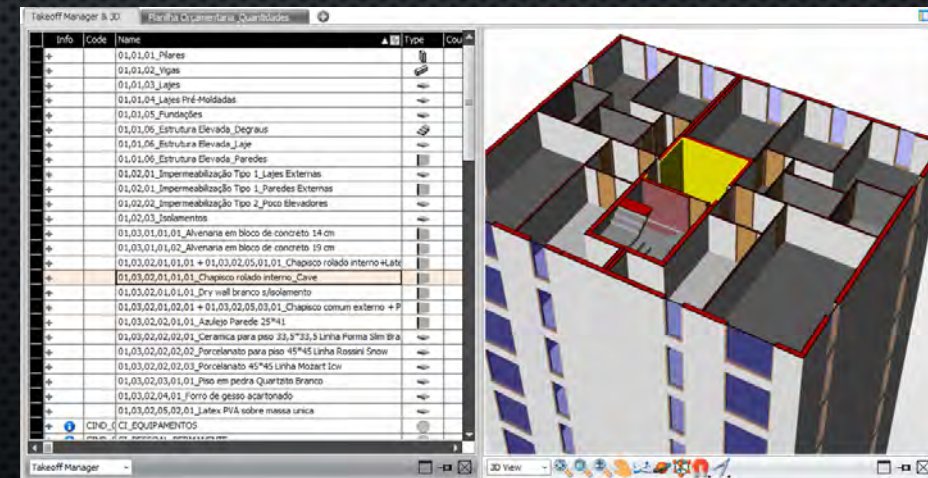
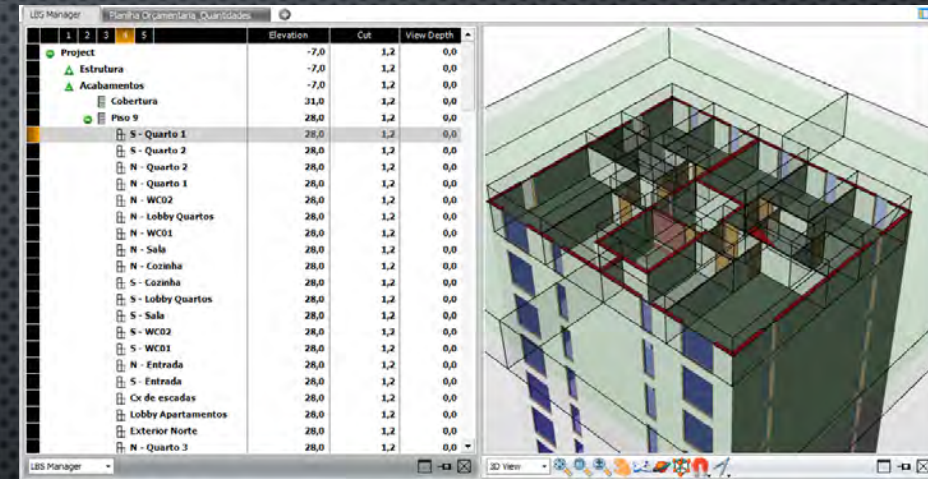
(5) SHOP DRAWINGS



Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

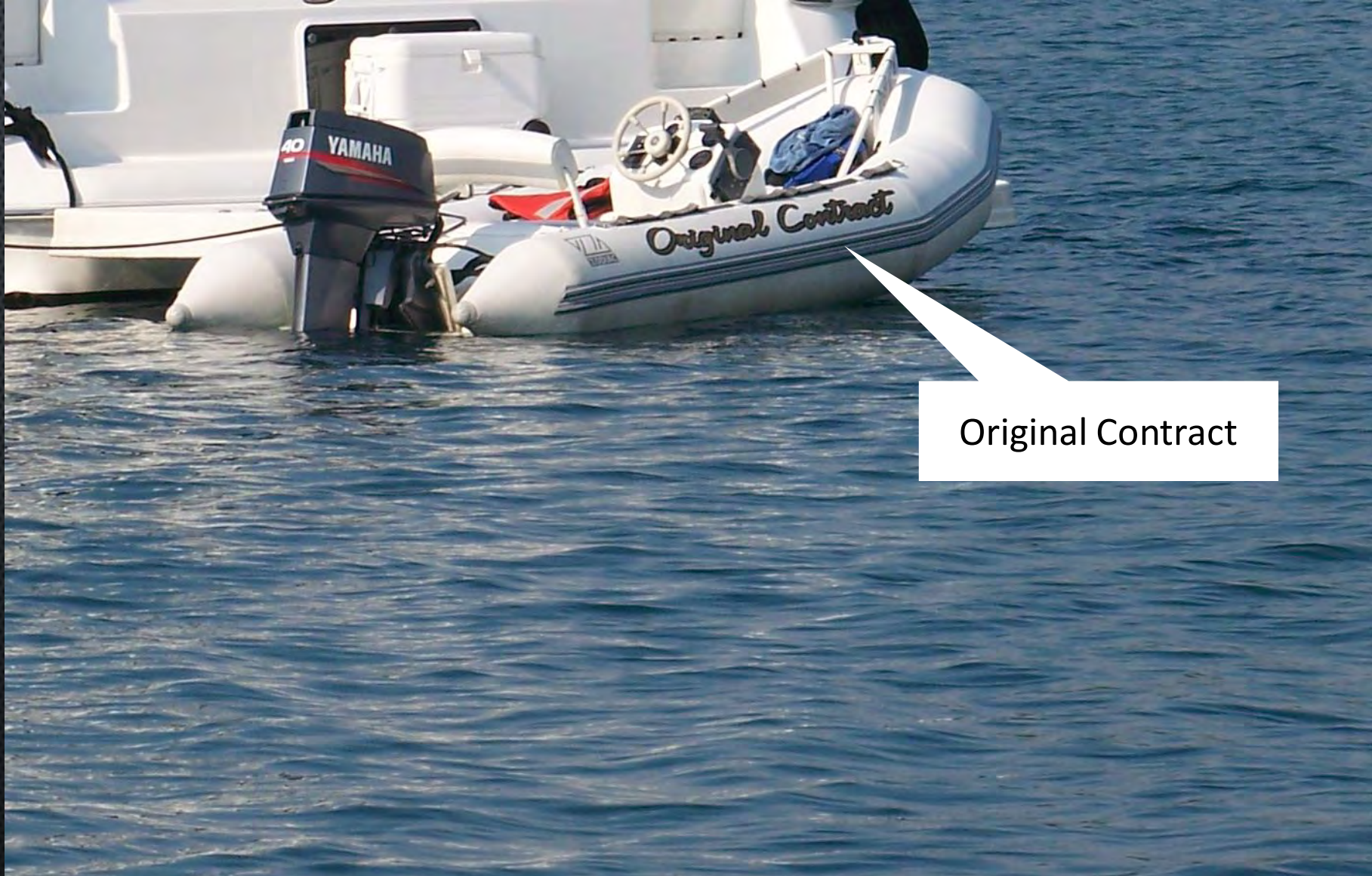
- Quantity Extraction acquires an enormous importance for Cost Estimation;
- Possibility to measure more in less time;
- The model based process is more reliable and error proof than the traditional method;
- Better Cost Estimates and Risk Mitigation.

[illegible]

THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



Original Contract

THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



Change Order

THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

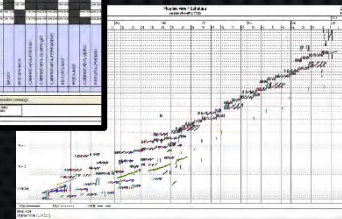
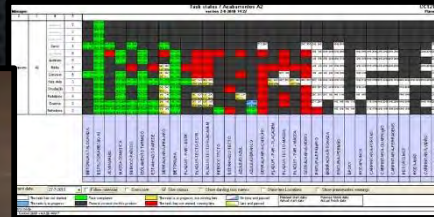
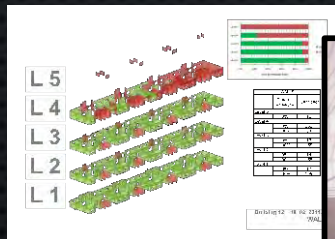
(7) BETTER SCHEDULING

- Pilots have shown us that there can be a 20% gain in the total duration of the construction with a proportional saving on the site:

Example:

Construction site cost can represent 10% or more of construction costs, so for a 10M€ site it can represent a savings of 200.000€.

- Line of Balance based discussion clarifies problems and options, promoting trust between partners.



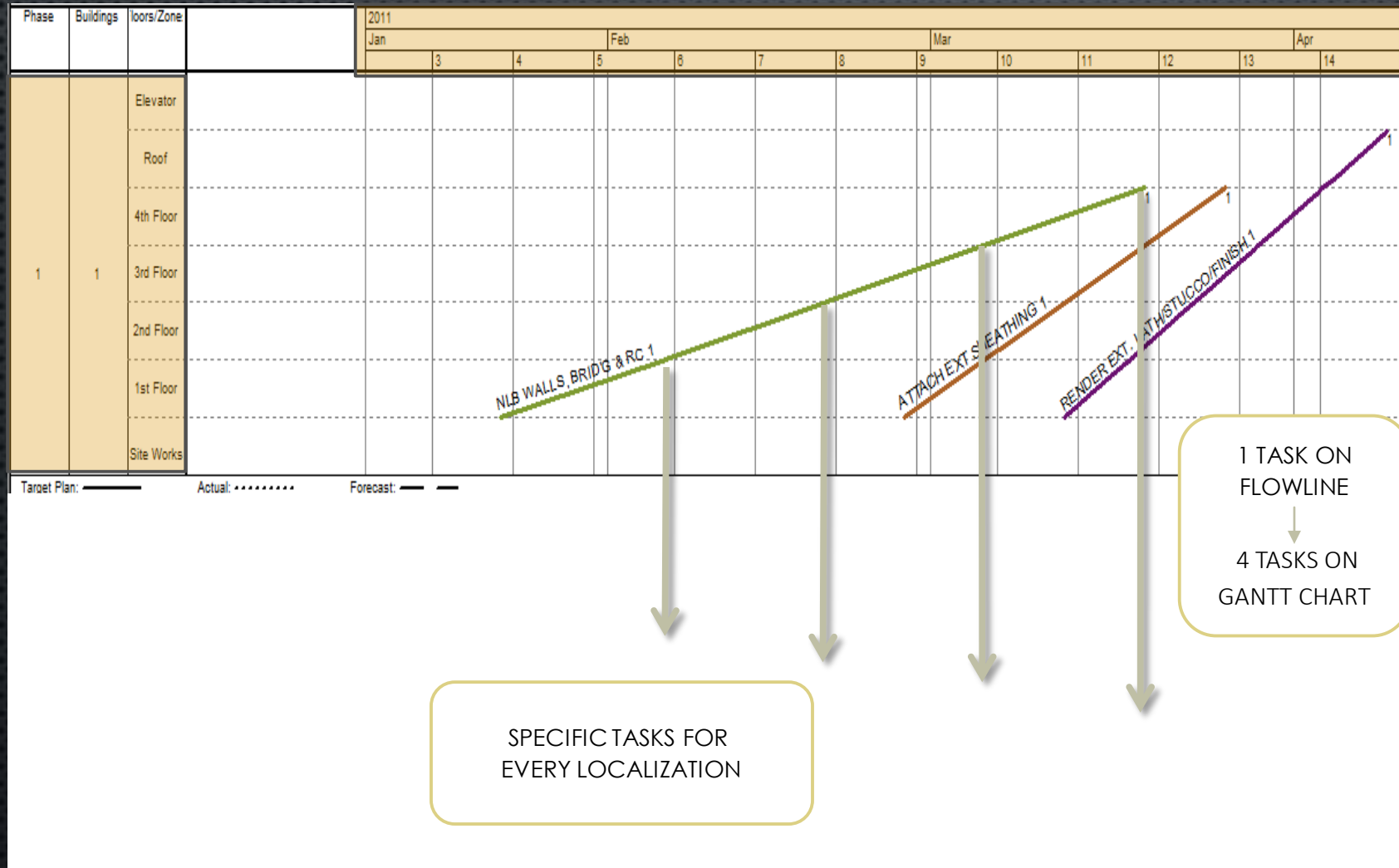
THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

LOCATIONS

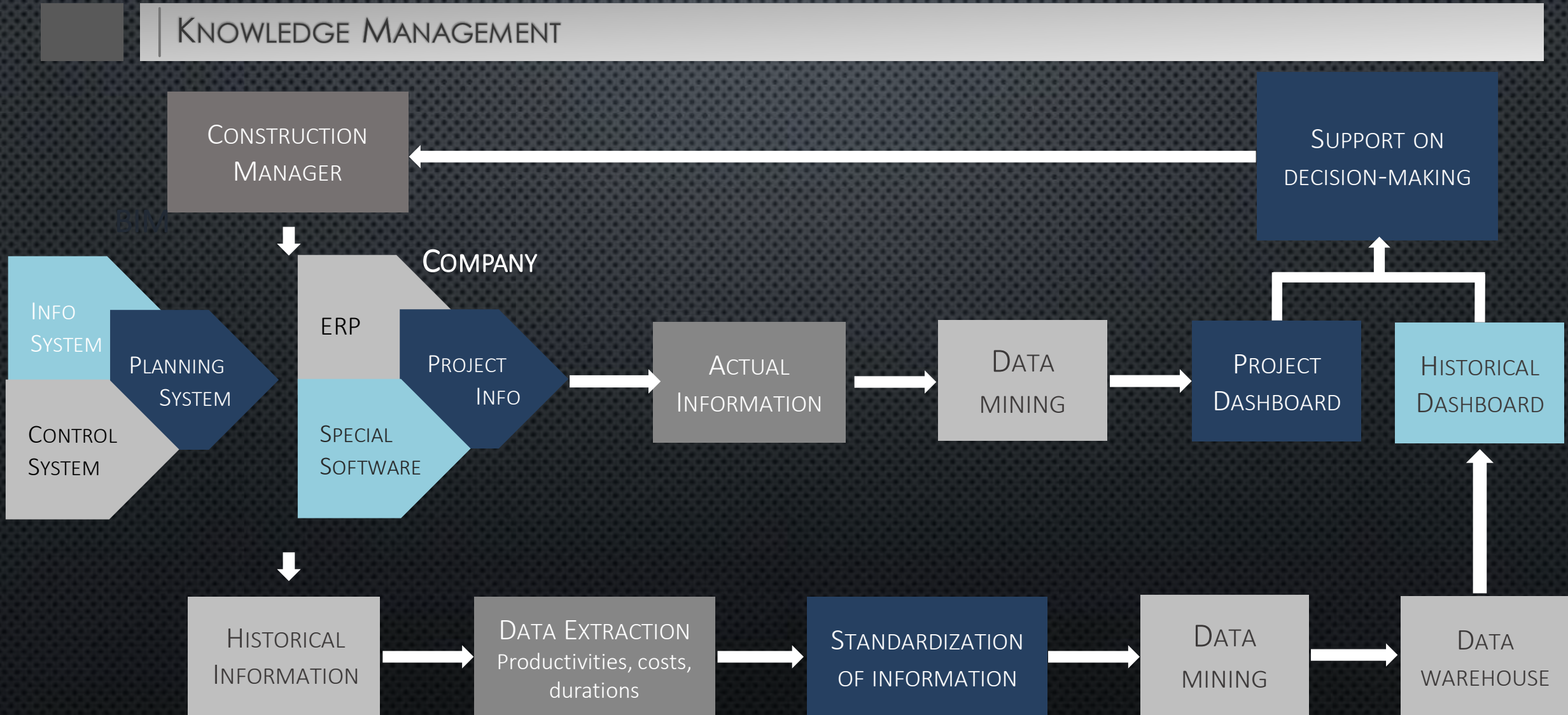
TIME



THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



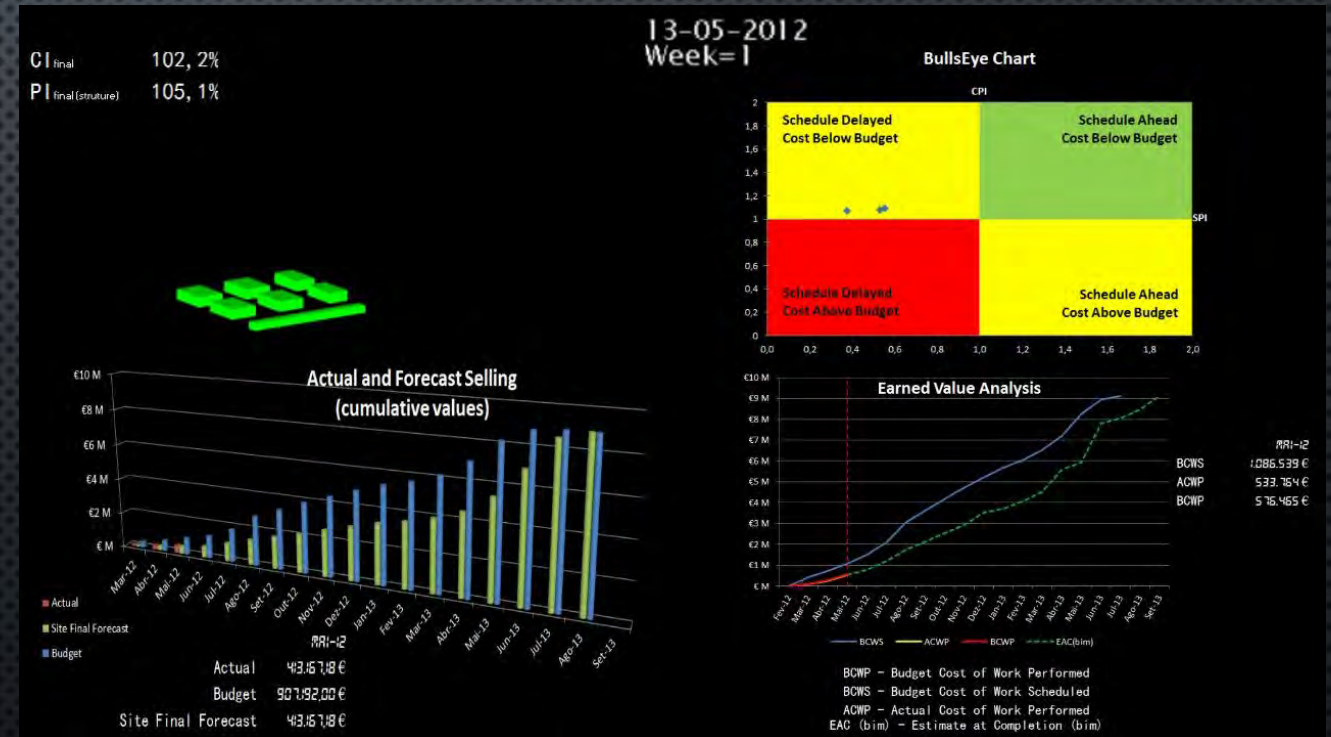
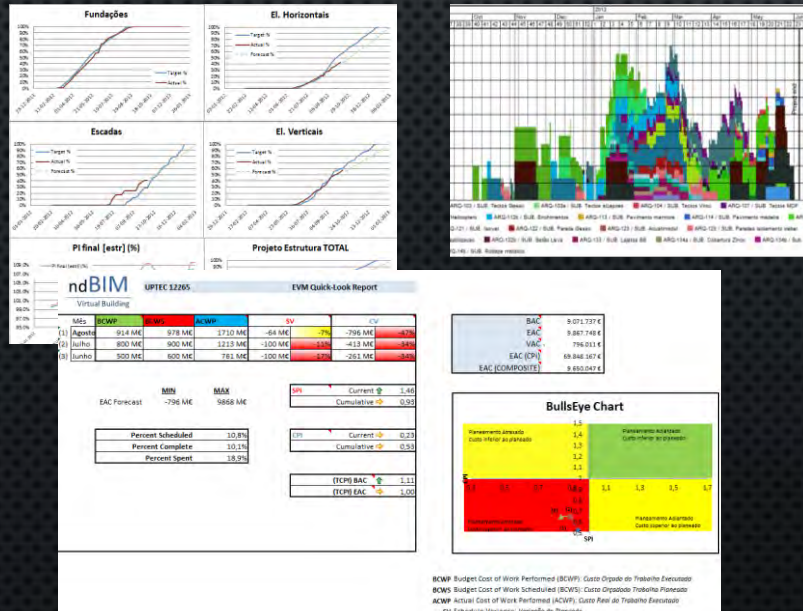
THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

CONCLUDING: MORE DATA TO DECIDE!

- . S-Curves
- . Earned Value Analysis
- . Resources Histogram
- . Etc.



THE TRUE 5D BIM!

THE 7 BENEFITS

Say "No!" to Hollywood BIM! Do it wisely!

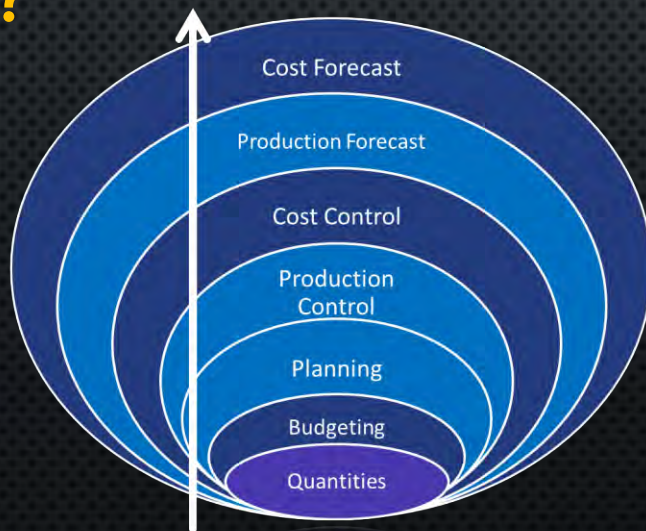
© 2014 António Ruivo Meireles ,
All Rights Reserved.

Say NO to Hollywood BIM!!

This is the path to True BIM!

1) At what point are you?

2) And how far do you want to go?



Absolutely, we use
BIM all the time!



Well, at least we
bought the software...

Dear Wendy, Film Stage - All Things F&E

Seven Steps:

1. Benchmarking
2. Strategy Plan and Goals
3. People and culture/change
4. Process Definition
5. Software Choice
6. Training
7. Pilots and Evaluation

Key findings

BIM IMPLEMENTATION STRATEGY

1. BENCHMARKING

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

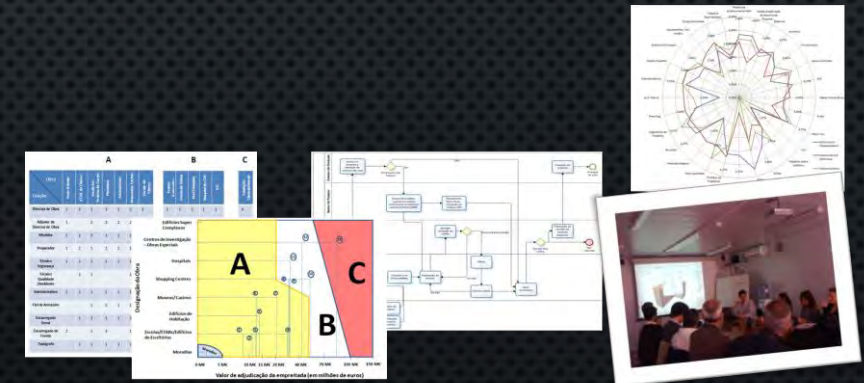
External Benchmarking

- analyzed hundreds of scientific articles, books and market studies published between 2008 and 2012;
- visited more than 15 international “BIM companies” (USA, Hungary, Finland, Sweden).



Internal Benchmarking

- Process mapping methodology through Swim Lanes
- Statistical research on optimal size of work teams
- Study on time spent on work activities



2. STRATEGY PLAN AND GOALS

Say “No!” to Hollywood BIM! Do it wisely!

A MASTER PLAN



3. PEOPLE AND CULTURE/CHANGE

Say “No!” to Hollywood BIM! Do it wisely!

- The need for a good evangelist that keeps motivation when facing difficulties;
- The culture and values of the organization must be aligned with the new approaches [empowerment, sharing, teamwork, etc.];
- The fact that not all want to enter on these concepts:
 - Fear of being overtaken by the colleagues;
 - Information overload;
 - Lack of time;
 - Lack of motivation;
 - Palatability and ease of using these “tools”
- The importance of the usefulness of the results that you can extract from the “BIM”;
- The importance of managing the expectations of those who collaborate;

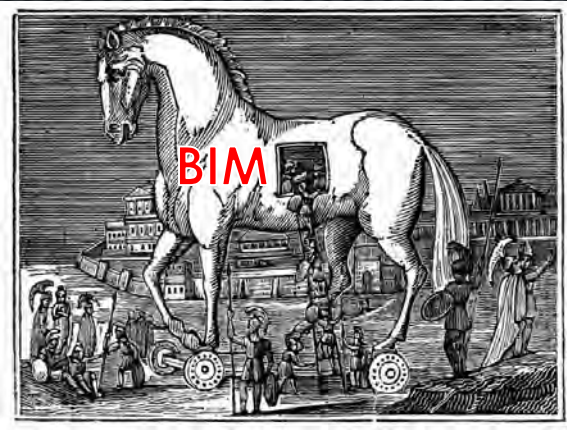
3. PEOPLE AND CULTURE/CHANGE

© 2014 António Ruivo Meireles ,
All Rights Reserved.

Say "No!" to Hollywood BIM! Do it wisely!

Diferent implementation strategies according to the corporate culture.

Trojan Horse



Profile 1:

- Large companies;
- High resistance to change;
- High inertia.



Profile 2:

- Small to medium sized companies;
- Less resistance to change and available for new methodologies;
- Reduced inertia.

3. PEOPLE AND CULTURE/CHANGE

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

BIM Stages

Both are valid and bring
results to a company...

... however the future is a
social BIM.



lonely BIM






social BIM

4. PROCESS DEFINITION

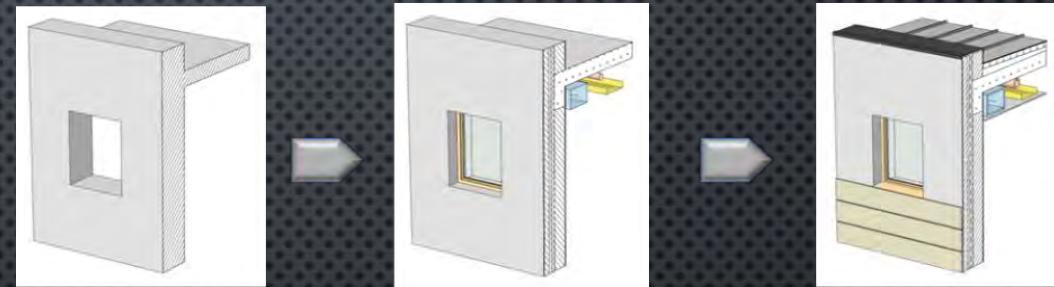
Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

GOALS (FOR WHAT?)

		
Standard 3D Services <u>Constructibility</u>	Standard 4D Services <u>Simulation</u>	Standard 5D Services <u>Virtual Construction</u>
3D Model + Constructability Analysis + Renderings and visitable virtual models	3D Model + Constructability Analysis + Renderings and visitable virtual models + Scheduling	3D Model + Constructability Analysis + Renderings and visitable virtual models + List of Quantities for Cost Bid + Scheduling and Optimization

LEVEL OF DETAIL (HOW?)



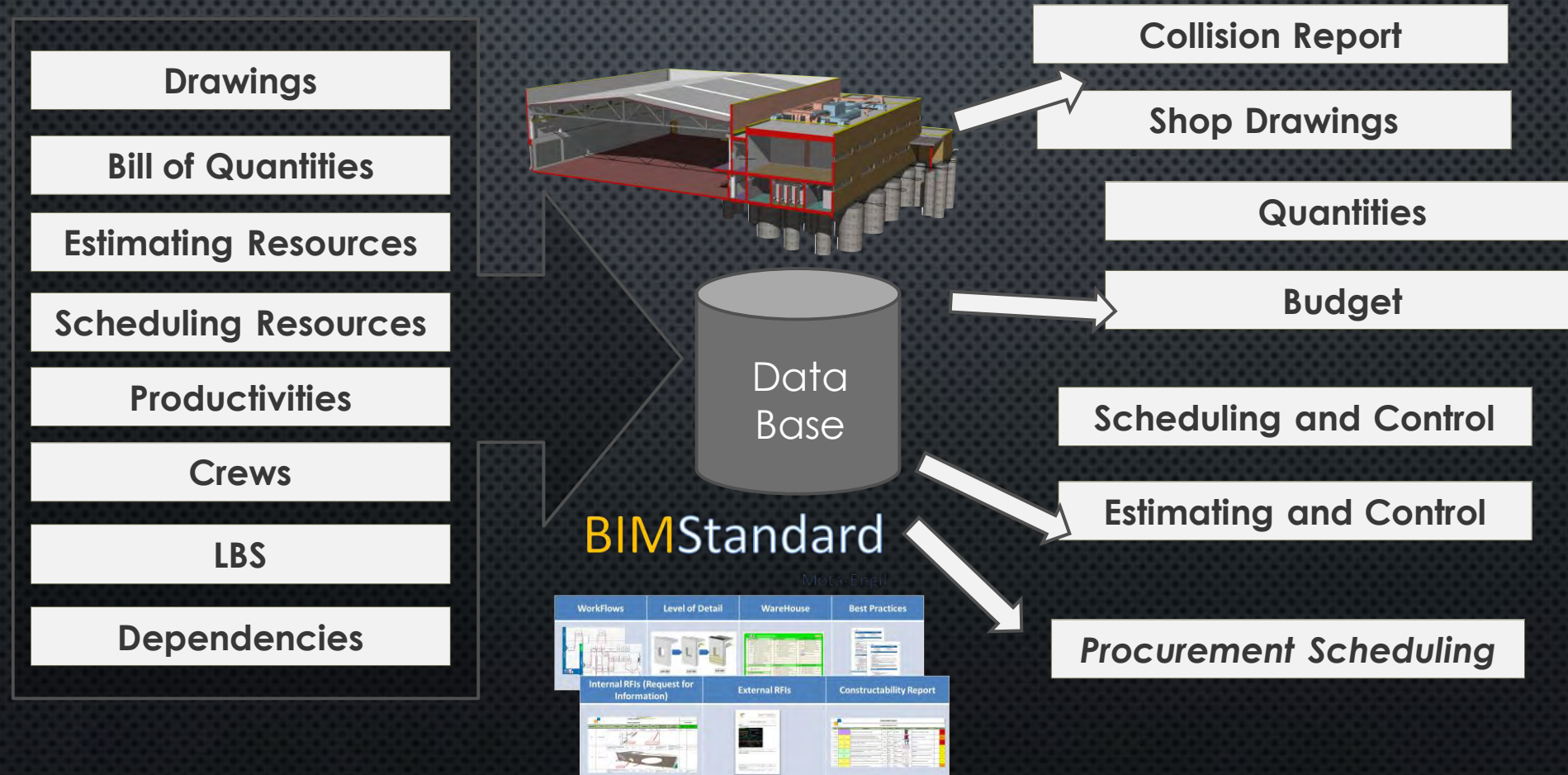
MODEL PROGRESSION SPECIFICATION (WHEN?)

		LEVEL OF DETAIL (CUMULATIVE)																		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
		Schematic / Marketing																		
		Quantities and drawings as a base																		
		Shop Drawings																		

4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



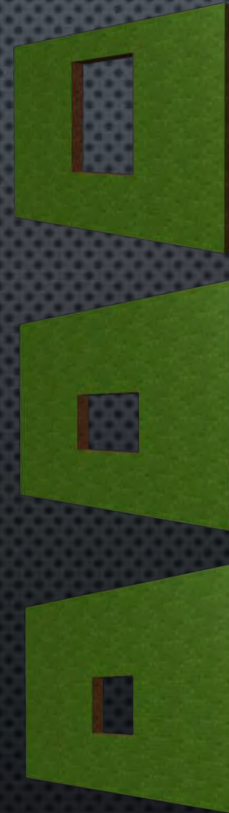
4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

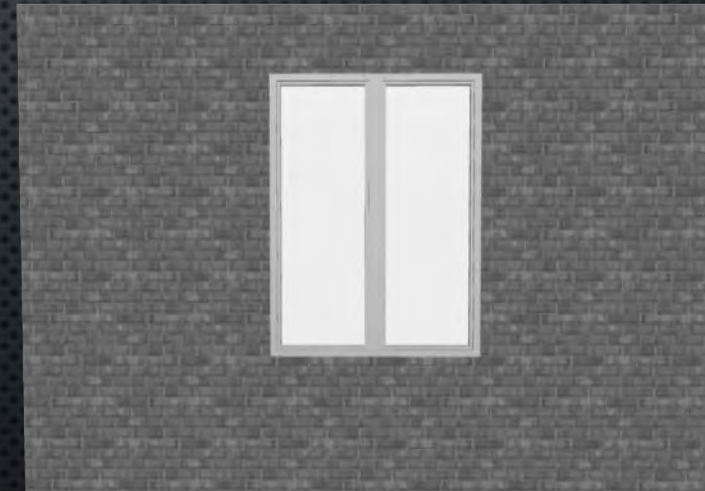
© 2014 António Ruivo Meireles ,
All Rights Reserved.

- 1st option:
Wall area – Window area
- 2nd option:
Wall area – (Window area / 2)
- 3rd option
Wall area – (Window area – 2)

...



Workmanship
necessary to build a
brick wall (m²)



BRAZIL

MÉTODO
Engenharia

LUCIO
ENGENHARIA

EDALCO
CONSTRUTORA

BARBARA
ENGENHARIA E CONSTRUTORA

CONSTRUCAP

Imogestim SA

4. PROCESS DEFINITION

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

Measurement Rules Standardized for work subcontract

Revestimentos - Paredes

Material - MA | Chapisco, emboço, massa única, revestimentos cerâmicos, etc.

- ☐ m² | Contabilizar a área líquida da parede, descontando todos os vãos
- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² devem ser descontados na sua totalidade

➤ A quantificação do material deste item terá como base a quantificação da área líquida da parede à qual será acrescida ou não a área de vãos. Para tal, os vãos inseridos deverão estar corretamente classificados. Ver documento referente ao método de modelagem relativo aos vãos.

Revestimentos - Paredes

Mão-de-Obra - MO | Chapisco, emboço, massa única, revestim

- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² devem ser descontados na sua totalidade
- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² devem ser descontados na sua totalidade
- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² e inferior ou igual a 4m² devem ser descontados em metade da sua área
 - Vão com uma área superior a 4m² devem ser descontados na sua totalidade

➤ A quantificação da mão-de-obra deste item terá como base a quantificação da área líquida da parede à qual será acrescida ou não a área de vãos. Para tal, os vãos inseridos deverão estar corretamente classificados. Ver apresentação referente à quantificação dos vãos.

Alvenarias

Material - MA

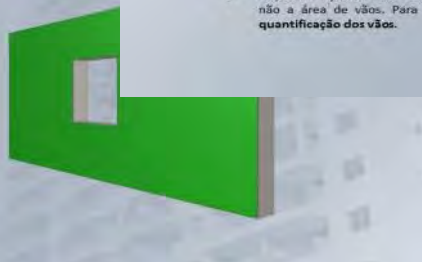
- ☐ m² | Contabilizar a área líquida da parede
- As paredes de alvenaria devem ser divididas por tipologias de acordo com a espessura do material.

Alvenarias

Mão-de-obra - MO

- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² descontam na área contabilizada apenas o excedente aos 2m²
- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² descontam na área contabilizada 50% da área do vão
- ☐ m² | Contabilizar a área da parede:
 - Vãos com uma área inferior ou igual a 2m² devem ser considerados cheios
 - Vãos com uma área superior a 2m² e inferior ou igual a 4m² devem ser descontados em metade da sua área
 - Vãos com uma área superior a 4m² devem ser descontados na sua totalidade

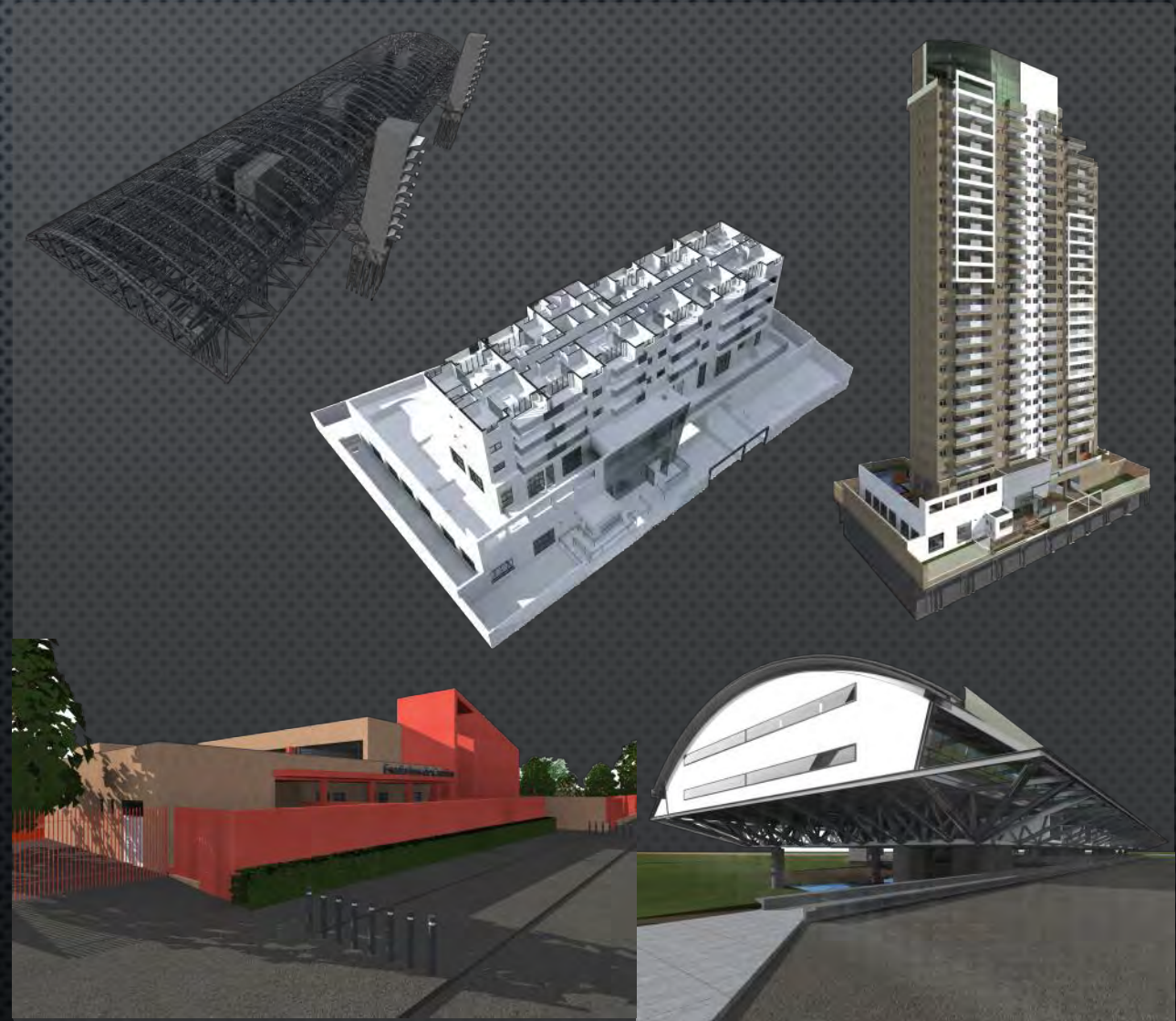
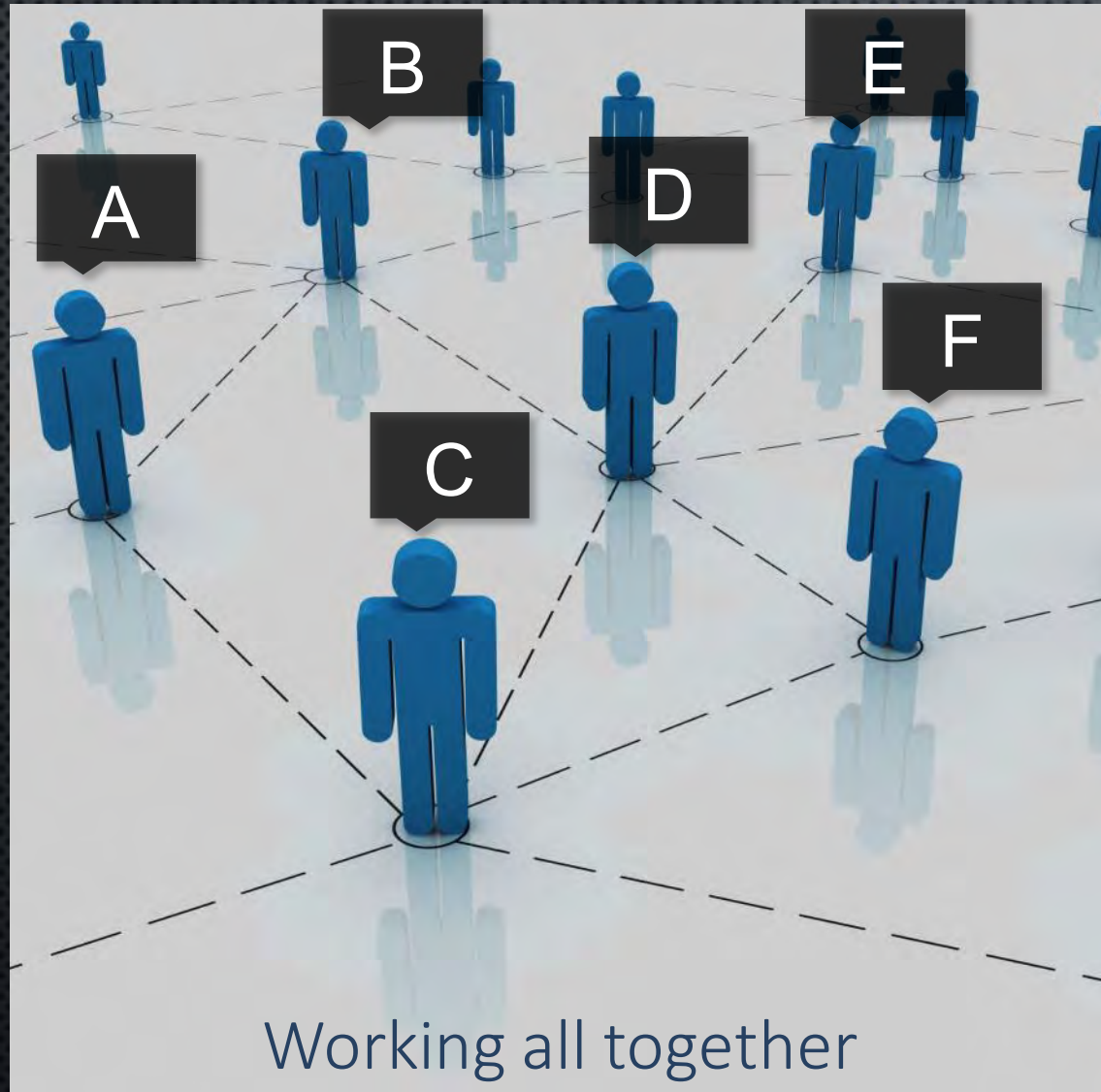
➤ A quantificação da mão-de-obra deste item terá como base a quantificação da área líquida da parede à qual será acrescida ou não a área de vãos. Para tal, os vãos inseridos deverão estar corretamente classificados. Ver apresentação referente à quantificação dos vãos.



4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

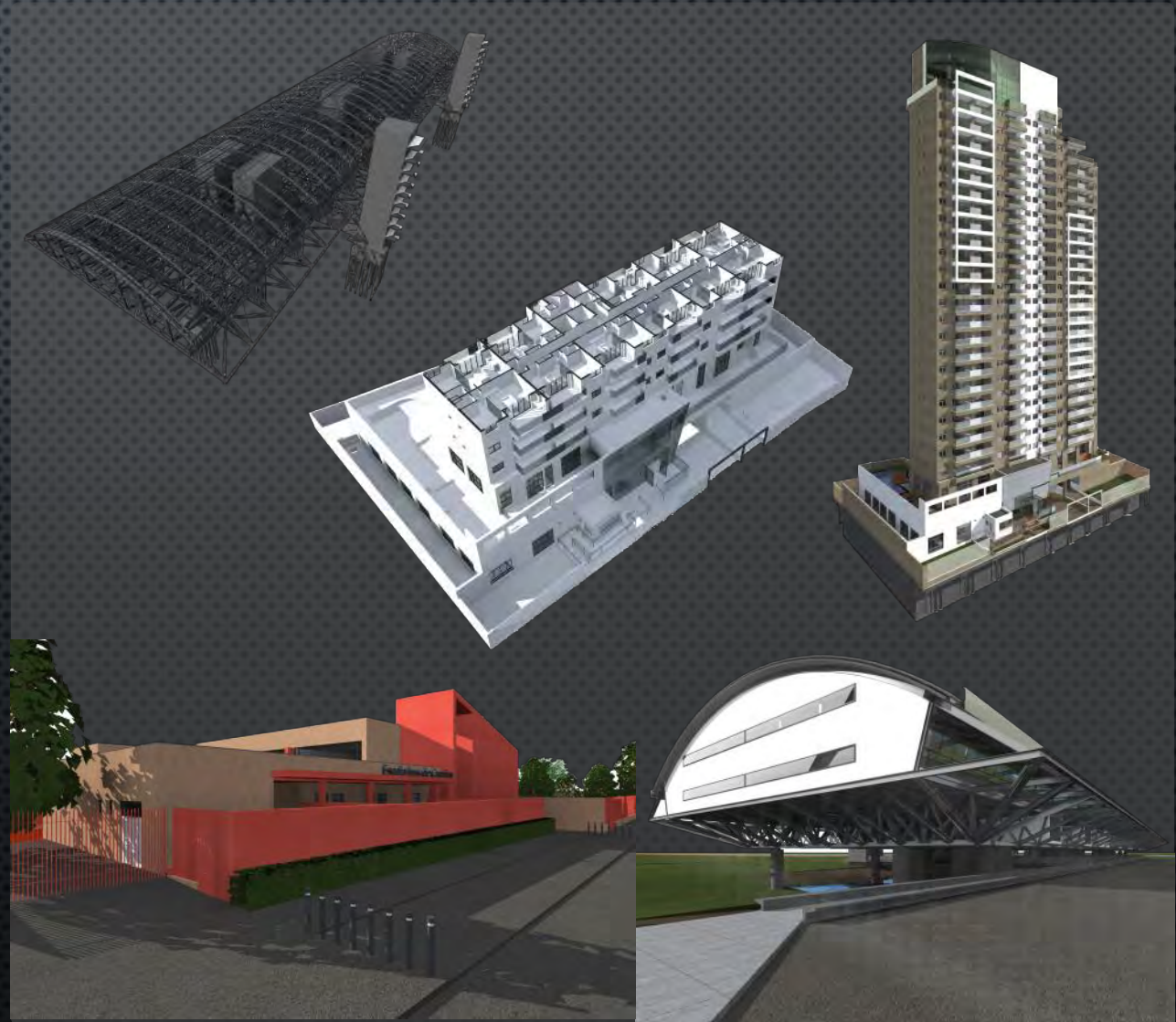
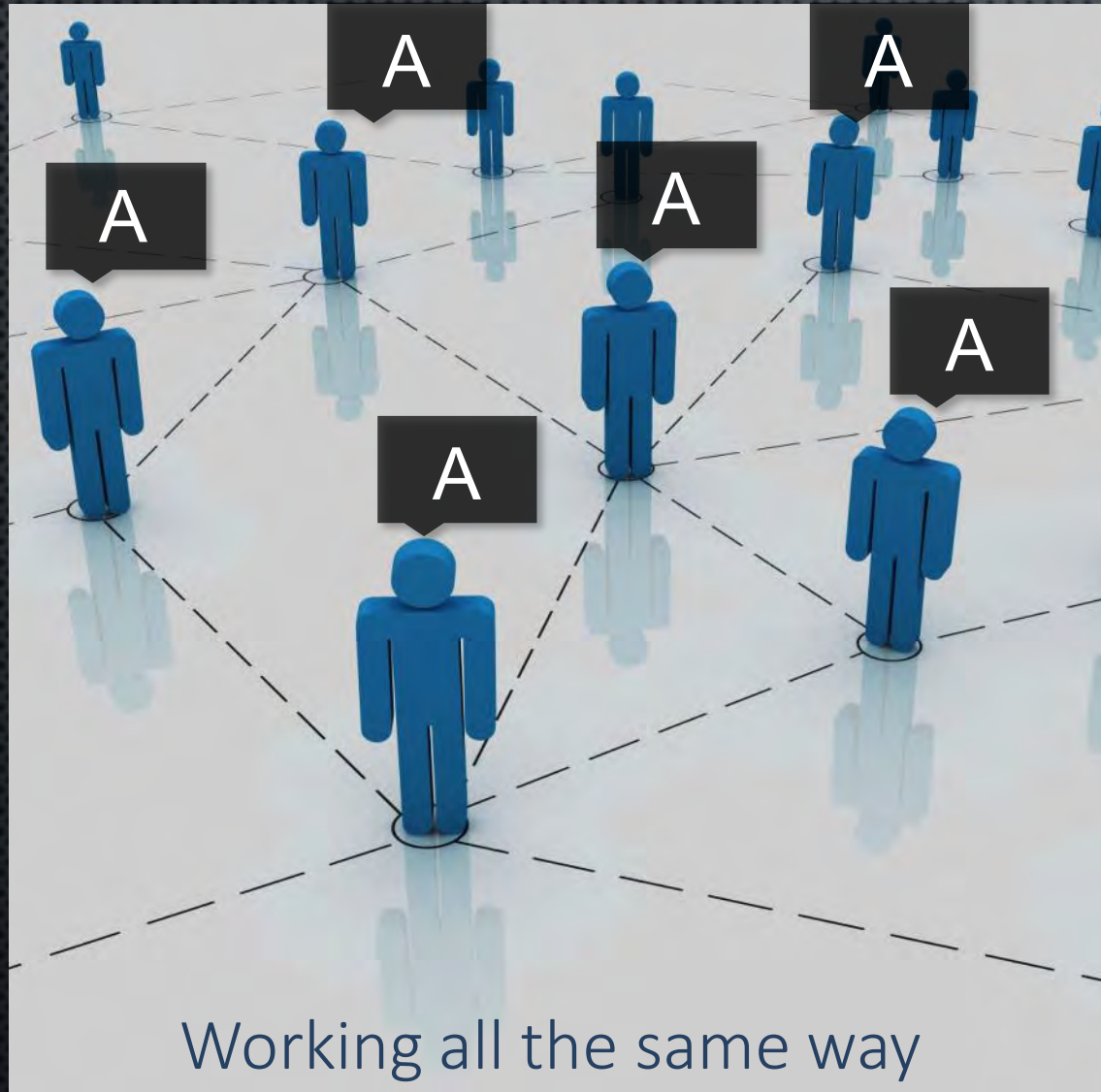
© 2014 António Ruivo Meireles ,
All Rights Reserved.



4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



4. PROCESS DEFINITION

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



**MODELING
LEVEL OF
DETAIL**



**MODELING
COST**



*There are numerous cases of
unsuccessful implementations
because companies do not know
what to ask when ordering BIM
Models!
And worse is that they believe that
making models is to have BIM !!*

5. SOFTWARE CHOICE

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



+



+

Advanced Content Plan



Economic Control



3D Model - Coordination



Shop Drawing



Quantities



Localized Quantities



Estimating



Scheduling



Scheduling Control



Cost Control

Advanced Content Plan Demo

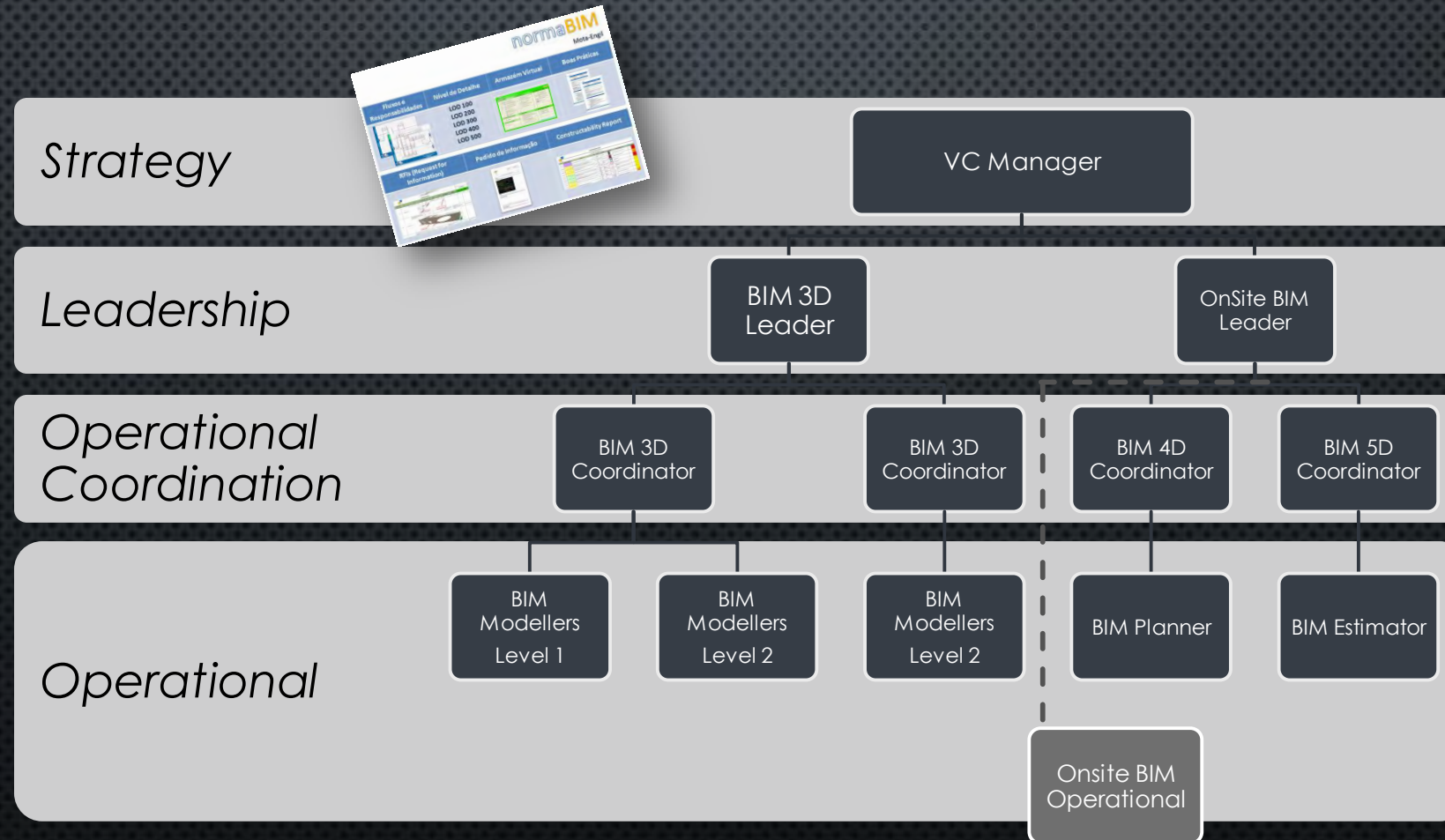


6. TRAINING

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

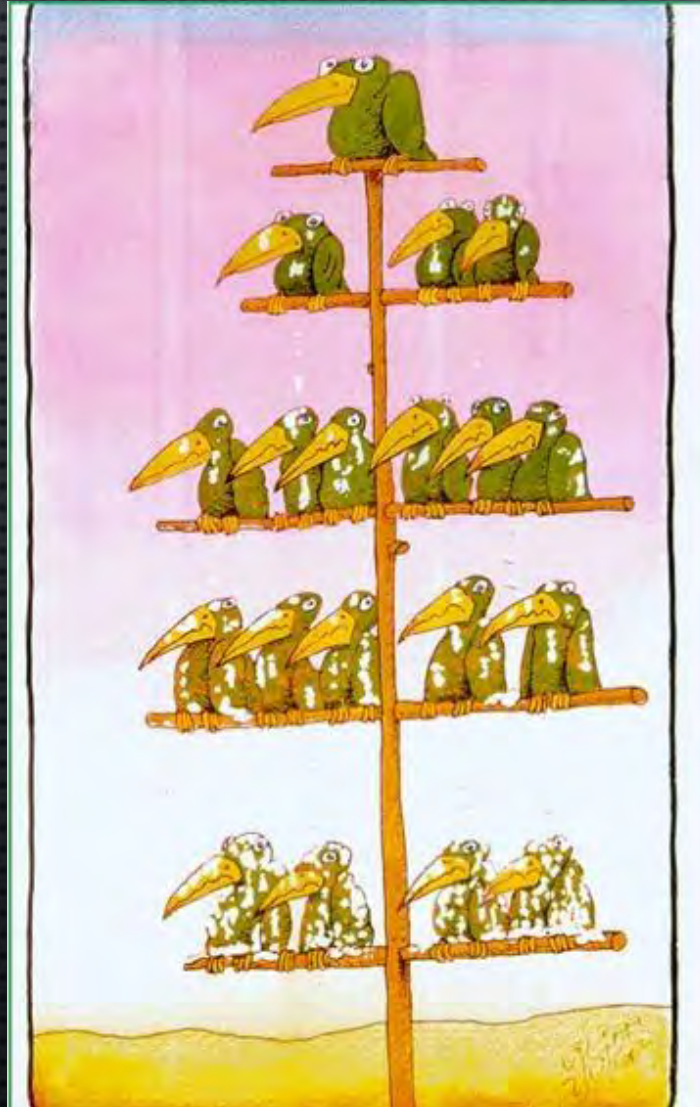
A FUNCTIONAL STRUCTURE... EVEN THAT THE COMPANY HAS A RIGID HIERARCHICAL COMMAND



6. TRAINING

Say "No!" to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.



THE PROBLEMS OF HIERARCHY

(“WITHIN” AND “BETWEEN”
COMPANIES)

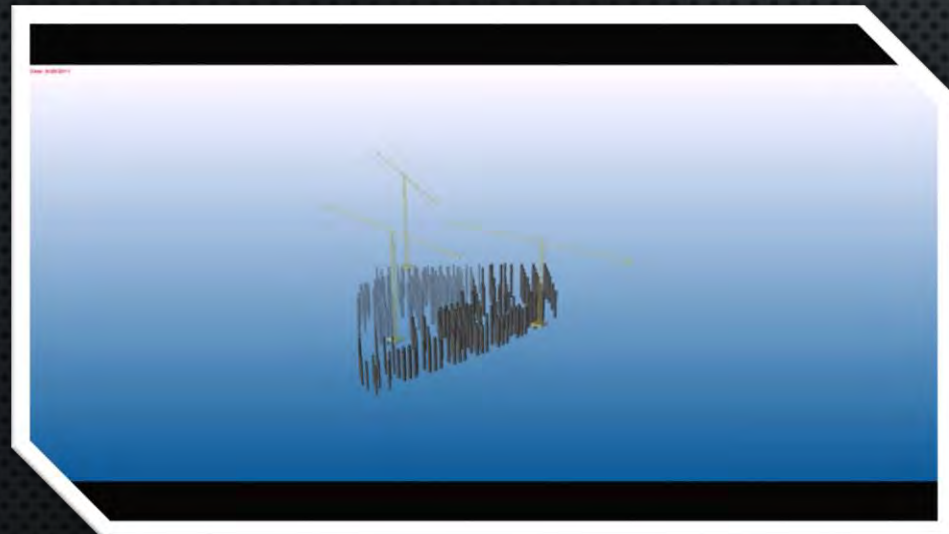
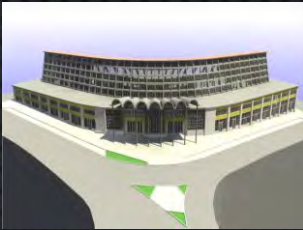
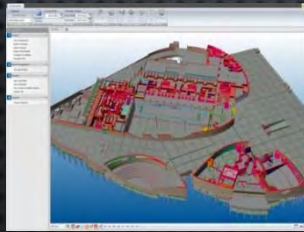
- Passage of Risk through the chain;
- Lack of Sharing;
- Does not favor Collaboration.

7. PILOTS PROJECTS AND EVALUATION

© 2014 António Ruivo Meireles ,
All Rights Reserved.

Say “No!” to Hollywood BIM! Do it wisely!

IMPLEMENTATIONS.... STEP BY STEP



	3D	4D	5D
Lapa Residential Building (10.000 m ²)	✓	✓	✓
Champalimaud R&D Center (75.000 m ²)	✓		
Huambo Residential Building (15.000 m ²)	✓		
Planinova Office Building (15.000 m ²)	✓	✓	✓
Terceira Island Hospital (70.000 m ²)	✓		✓
Maputo Towers (50.000m ²)	✓		
3 Lisbon Schools (10.000 m ² each)	✓		
Ferreira de Castro School (10.000 m ²)		✓	
Olympic Village in Maputo, Mozambique (900 apartments)	✓	✓	
Leixoes Cruise Terminal (15.000m ²)	✓	✓	✓
Mercado Bom Sucesso Hotel (10.000 m ²)	✓	✓	✓
Coches Museum (15.000m ²)	✓		
EDP HeadQuarter (60.000m ²)	✓		
UPTEC Office Building (15.000m ²)	✓	✓	✓

8. KEY FINDINGS

Say “No!” to Hollywood BIM! Do it wisely!

© 2014 António Ruivo Meireles ,
All Rights Reserved.

BIM Evangelist

- Conquer your Board and different departments!

BIM Strategy Group

- Study the potential return on investment
- Define the main targets

BIM Roadmap

- **What** is the goal?
- **Who** will be involved?
- **When** they will be involved?
- **Where** we will implement this?

BIM Task Group

- **Select the right people**
- **Avoid the barriers**
- **Develop internal BIM Standards**

Training & Pilot Project

- **Start with a small project**
- **Put the same stress as in a real project**

Project
Evaluation

One step at a time!

If...

...You involve **“true”** BIM experts on your implementation,

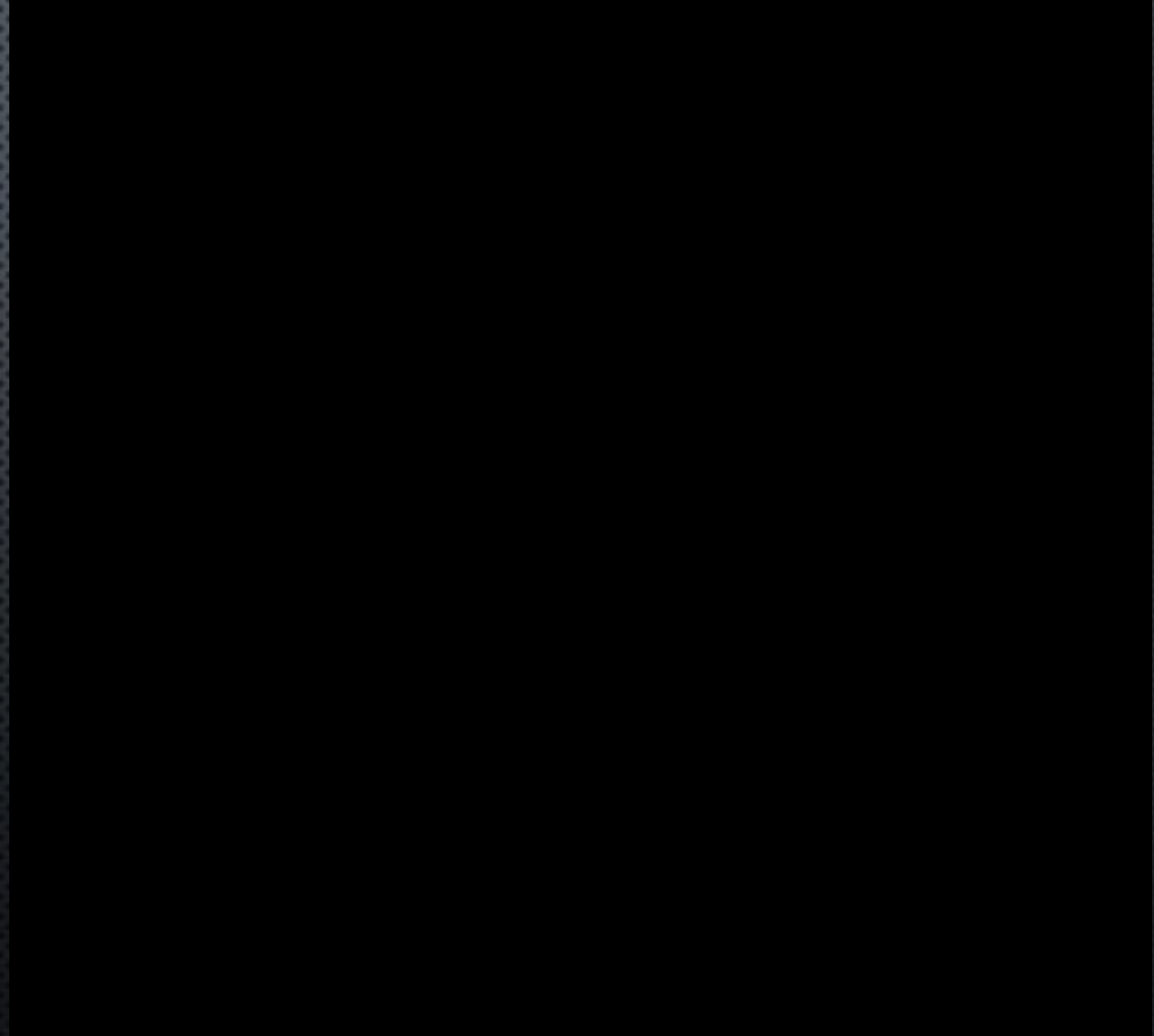
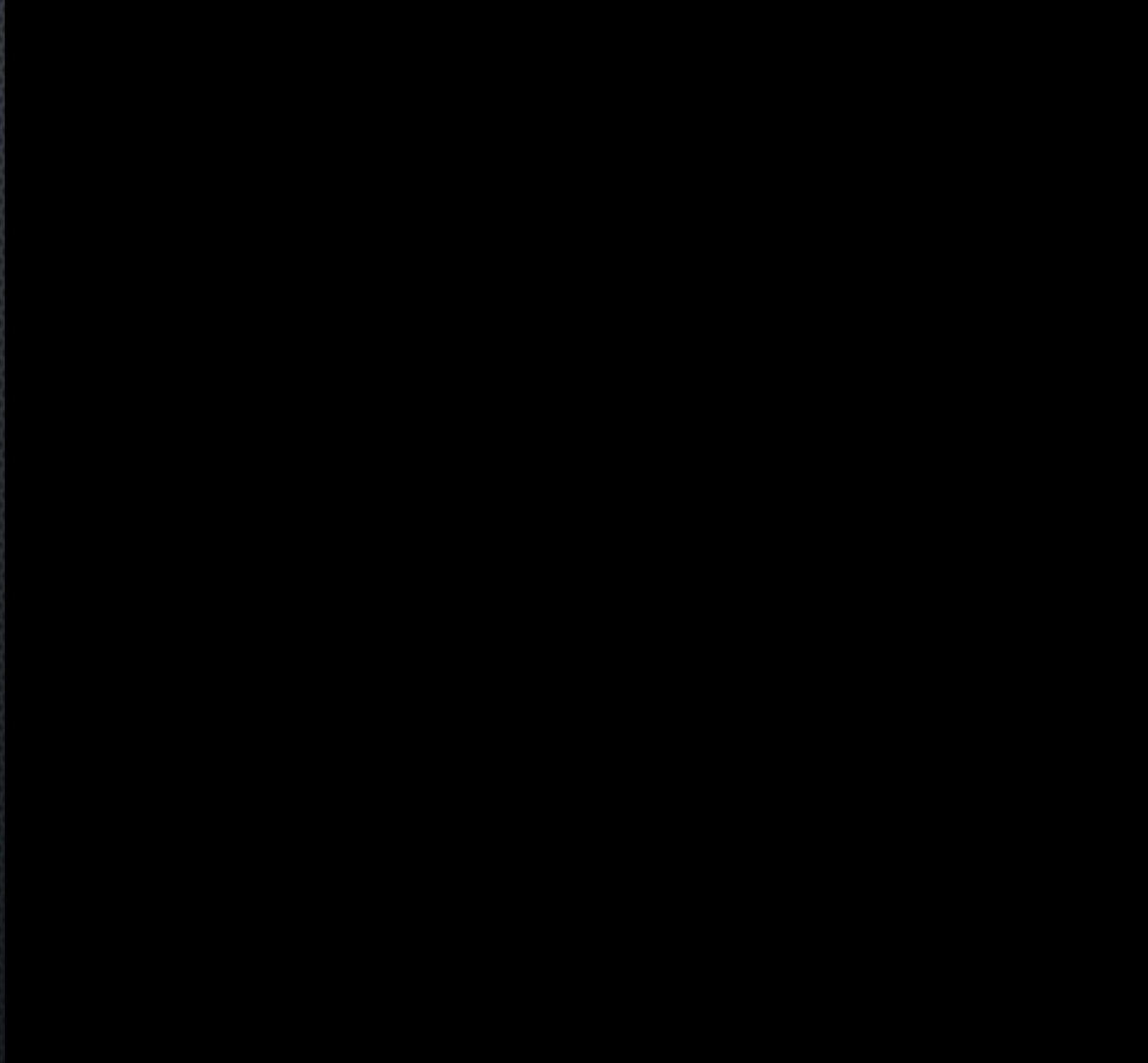
you will implement everything **faster and with less risk.**

Try to avoid reinventing the wheel!

TO WORK BETTER AND WITH PLEASURE. **BIM IS FUN!!!**

© 2014 António Ruivo Meireles ,
All Rights Reserved.

Say “No!” to Hollywood BIM! Do it wisely!



I invite you to join us on
the BIC2014 in Lisbon on
October 9 and 10



More information

<http://bimforum.com.pt>

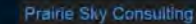
Social Events

[See more...](#)

Conference Dinner – October 9



Closing Party – October 10



António Ruivo Meireles

FOUNDER

ndBIM
VIRTUAL BUILDING

ARMEIRELES@NDBIM.EU

LINKEDIN: ANTONIORUIVOMEIRELES

CELL PHONE: +351 917 663 458

WWW.NDBIM.EU