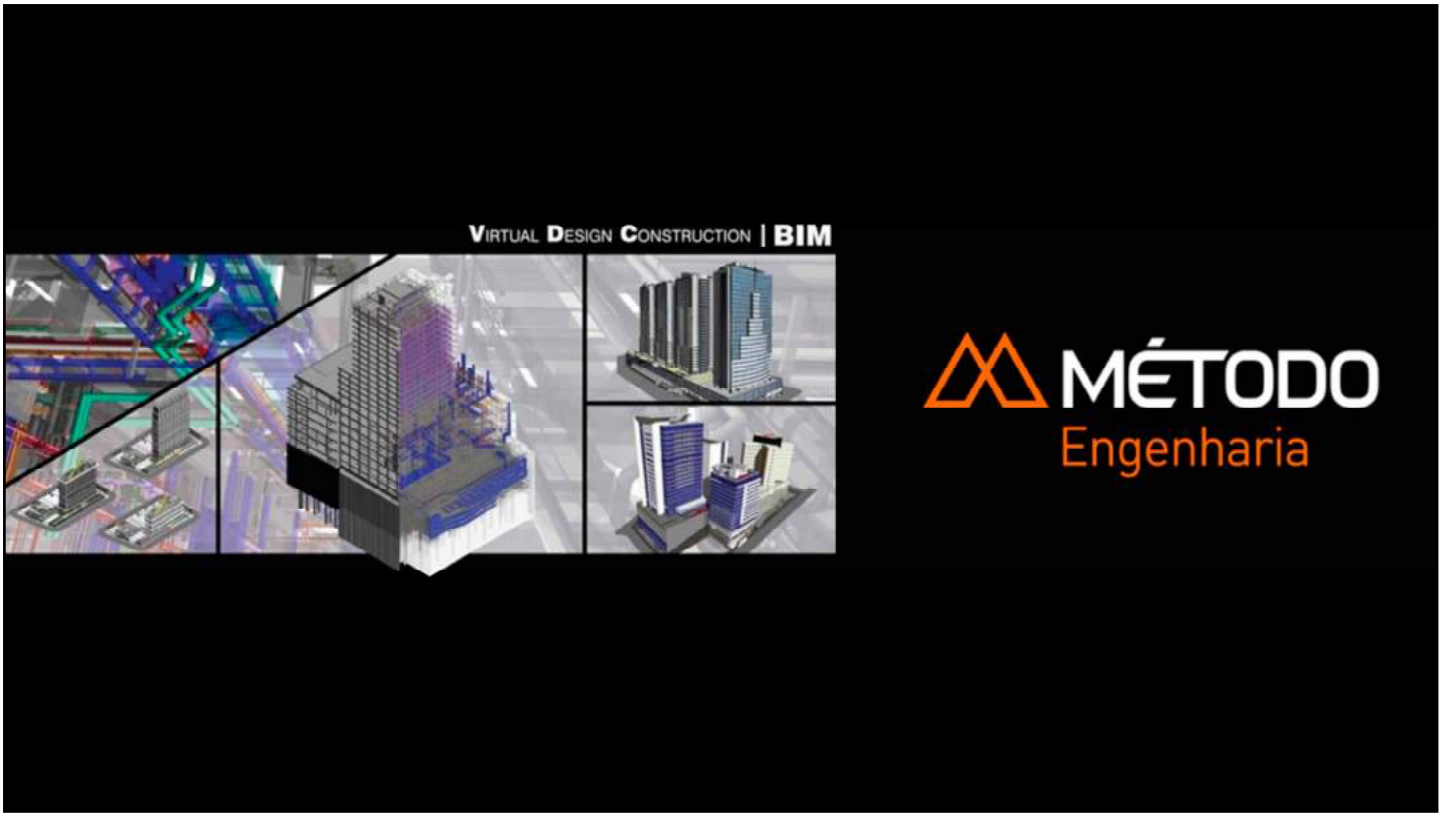


First, I would like to thank the BIM Aarhus committee for inviting me. It is a pleasure for me to talk at this conference and to have the opportunity to present the work we have been doing at Método Engenharia concerning the BIM Implementation.

My name is Joyce Delatorre. (I'm an architect and engineer and) I'm the head of the BIM Department at Método Engenharia. In the last seven years, I've been focusing on implementing the BIM process in the work flow in all the different departments in the company.

With this implementation process, we have achieved many of our/ various goals.

During this presentation, I would like to share with you the process and the results of the use of BIM in some projects, from the Design Management phase to Planning and Cost control on the field.

Agenda

- Método Engenharia
- BIM: Overview Brazilian Market
- BIM at Método (Goals and Implementation Process)
- Case 1: Clash Detection
- Case 2: Coordination
- Case 3: A Pilot 5D Project
- Conclusion

About the agenda…

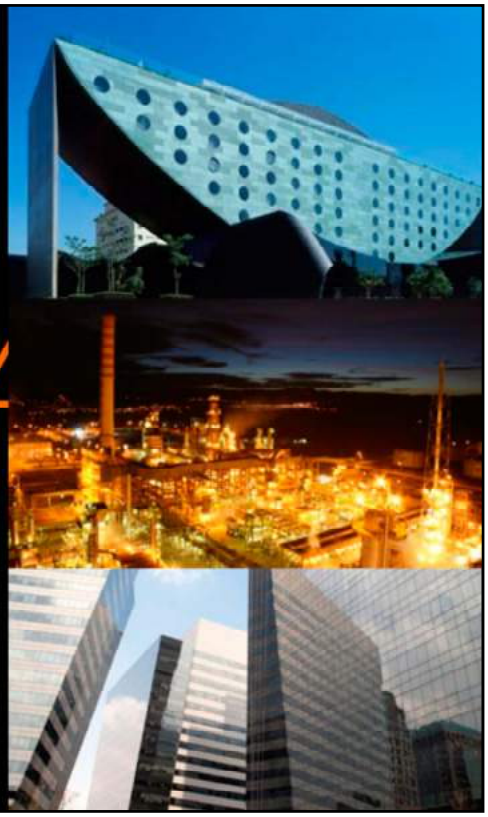
First, I'll talk a little bit about my Company and give you an overview of the BIM uses in the Brazilian Market.

Then, we will move on to the BIM goals and the process of implementing BIM at Metodo.

I'll also present three cases in order to (illustrate / or give some examples of) the use of BIM in the development and management of projects.

And at the end, I'll talk about the lessons learned and our future goals.

About Método



Metodo was founded in 1973 by Hugo Rosa, a Production Engineer.

Metodo is a benchmark in the construction field / business. Currently, Metodo provides integrated solutions in engineering, construction and maintenance for high-complexity projects.

It has built over 7 million square meters in the past 42 years.

Metodo's processes are based on PMI 's (Project Management Institute) best practices, and we employ sustainable concepts in our projects in order to suit our clientes' needs, be environmentaly friendly, and conserve natural resources.

Método is renown for being a pioneer in the use of innovative technologies. For us:

Método is a group composed of three bussiness units:

•Método Engenharia is a Método Business Unit specialized in engineering and construction, focused on: corporate buildings, hotels, hospitals, shopping malls and industry.

•Método Fast is a Método Business Unit, for companies with special needs for fast track work execution. Its operation is expressive for specialized segments, such as bank network, fuel distributors, food chains, fast food, and department stores.

•The industrial unit, called Potencial Engenharia is recognized as one of the main suppliers on the construction, assembly, and industrial maintenance market. Potencial Engenharia developed its competences necessary to act in broad and complex projects in the Oil and Gas, metallurgy, steel and energy segments, among others.

Location

- **Método Engenharia** is located in São Paulo - Brazil
- **Brazil:** the largest country in **South America** and the fifth largest country in the world
- **Population** (>200 million)
- **São Paulo**: the **largest city** in Brazil (>11,8 million)
- Contracts all over the country

Source: IBGE - Instituto Brasileiro de Geografia e Estatística, 2013

Método is located in São Paulo – Brazil

Brazil: the largest country in **South America** and the fifth largest country in the world. It has a population of over 200 million.

And our head office is in São Paulo, which is the largest city in Brazil.

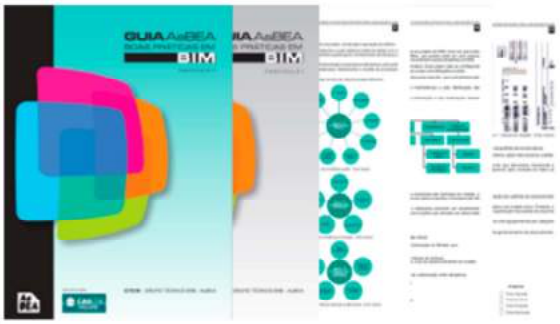
Método has contracts all over the country.

Estado de São Paulo 43.663.672

Just to contextualize, I brought a short overview of the current use of BIM in Brazil.

Brazilian Market - Overview

- A turning point in the Construction Market
- First standards efforts: ABNT, AsBEA
- Owners demand BIM for their projects: Public and Private
- Most of our consultants work with BIM: Architects, Engineers, MEP Engineers
- Building product manufactures: parametric BIM catalogs - 3D services



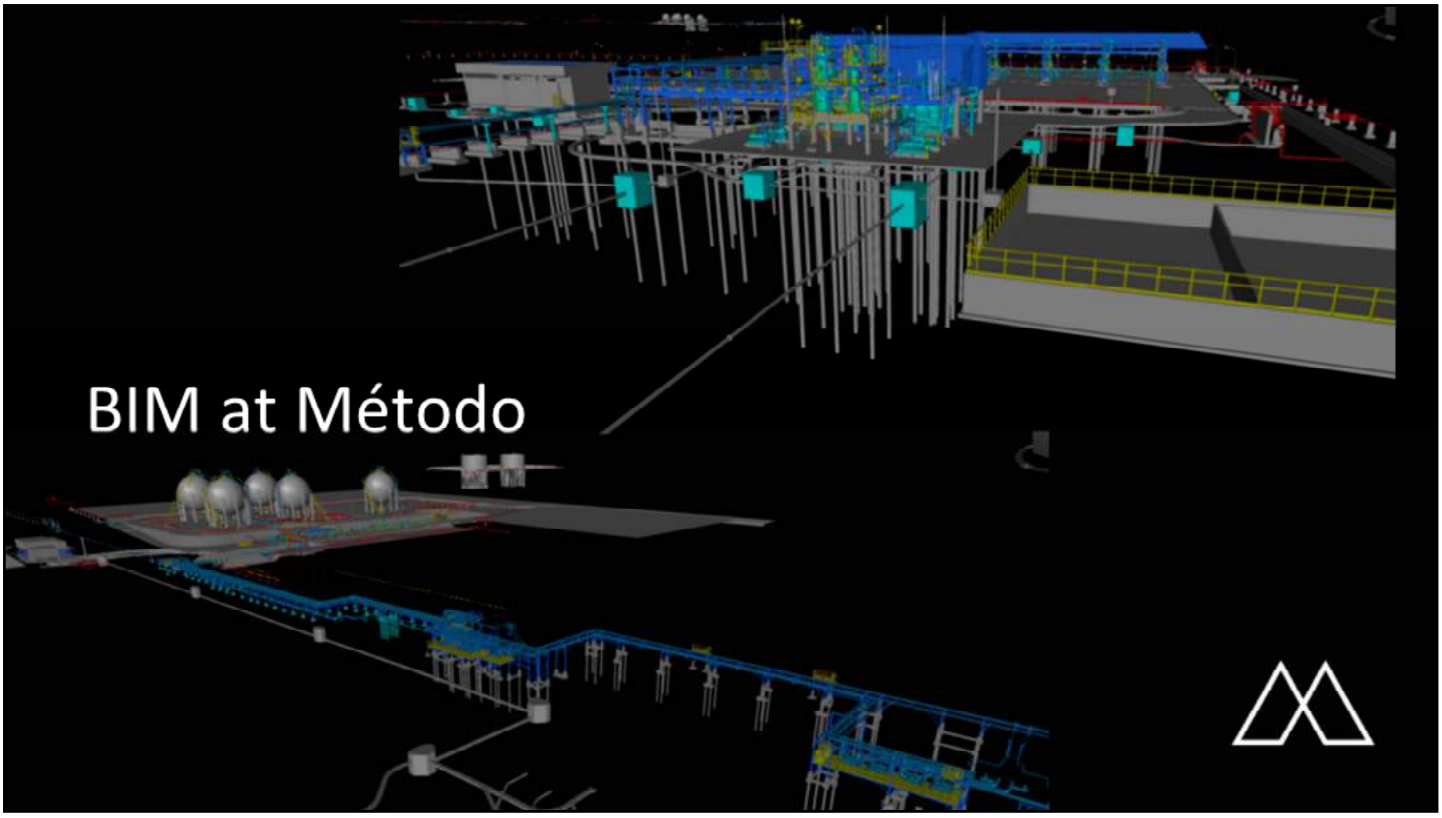
In Brazil, we are facing a turning point concerning the BIM Implementation…

Some institutes and associations are making the first efforts to develop standards to apply BIM to projects in Brazil. On the TOP, we have two guides recently developed by a technical group, in which I collaborated/ I participated. The first edition was a guide on how to structure an office to work in a BIM environment, and the 2nd. one is about the changes in the design workflow to develop a project working in BIM.

In the past two or three years, the number of owners who work with public and private buildings has increased, and they demand the use of BIM in their projects. For example, since 2014, the government of Santa Catarina, a state in southern Brazil, has made the use of BIM mandatory in the development of projects for public hospitals.

Nowadays, entire teams of consultants work on BIM Projects. Most of our consultants are working with BIM while others are already experimenting with the technology.

Manufacturers have identified the opportunity to develop BIM catalogs -- 3D services for designers to be able to apply the materials in their projects by using the BIM software.


BIM at Método

BIM Goals at Método

MÉTODO Engenharia

Improve efficiency and effectiveness in the Project Management Process!!

- Boost overall project quality - meaning fewer problems onsite
- Facilitate communication – Integration and coordination between teams
- Integrate Time, Cost and Scope in Management
- Increase understanding and predictability – reduced risk
- Prevent waste

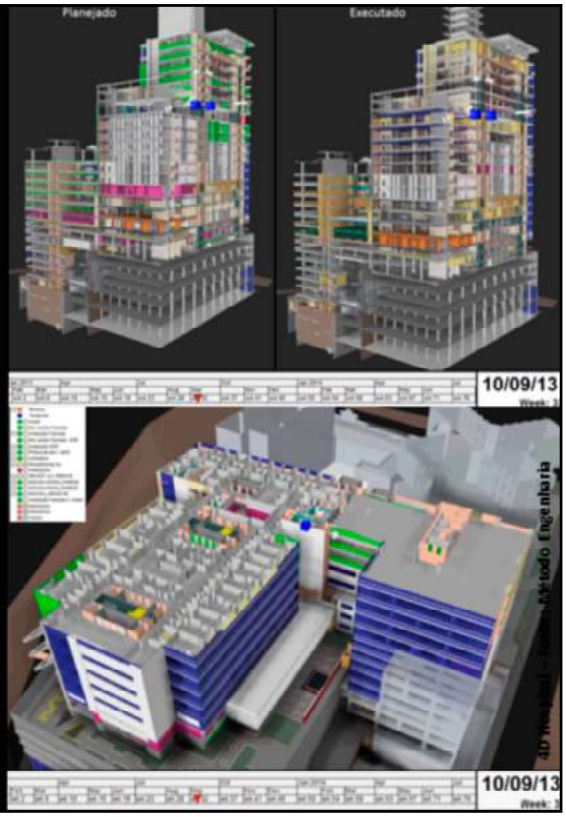
The main goal at Método with BIM is to improve efficiency and effectiveness in the Project Management Process

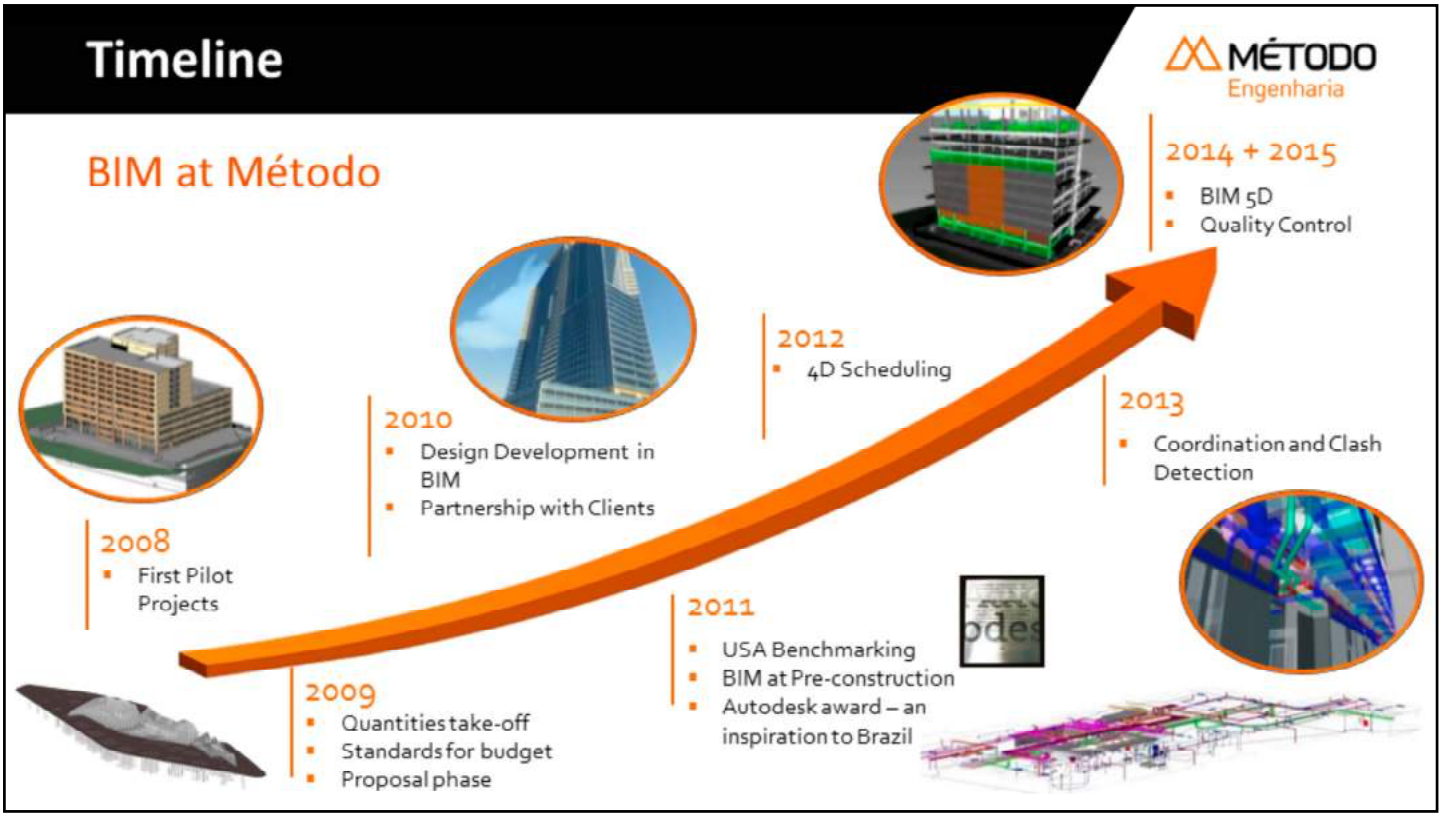
And also...

- Boost overall project quality (we usually have many problems onsite and using BIM our goal is to achieve better quality in our projects, meaning less problems onsite)
- Facilitate communication (Promoting integration and coordination between teams)
- Integrate time, Cost and Scope in Management ... (if we have any changes in Scope, for us it is important to evaluate the impact on cost and time)
- Increase understanding and predictability – reduced risk (all data is clear and accessible for many kinds of analysis)
- Prevent waste (with less problems and more predictability we can avoid rework and solve the problems before construction)

In the last part of the presentation I'll present two cases and you will be able to see how we achieve some of that goals...

BIM Implementation





We started the BIM implementation in 2008. First we (tried / used) the technology in some Pilot Projects to see whether it would (suit / fit) in our internal process.

In 2009, we started the use of BIM in the proposal phase. For that purpose, we had developed some standards to adapt the information we could extract from the model to our budget needs.

In 2010, as contractors we started to use of BIM in the Design Devepelopment phase in partnership with clients and also helped their partners to implement the BIM process.

In 2011, we had the opportunity to do Benchmarking in BIM in some construction companies in the USA. In that year, we won the Autodesk award in recognition for the results we achieved by using BIM at Metodo.

Starting in 2012, we successful have used BIM in 4D scheduling, coordination, and clash detection in our projects.

Currently, we are implementing BIM 5D with substancial results as you'll be able to see in Case 2.

Stakeholders

MÉTODO Engenharia

How does the process impact their life?

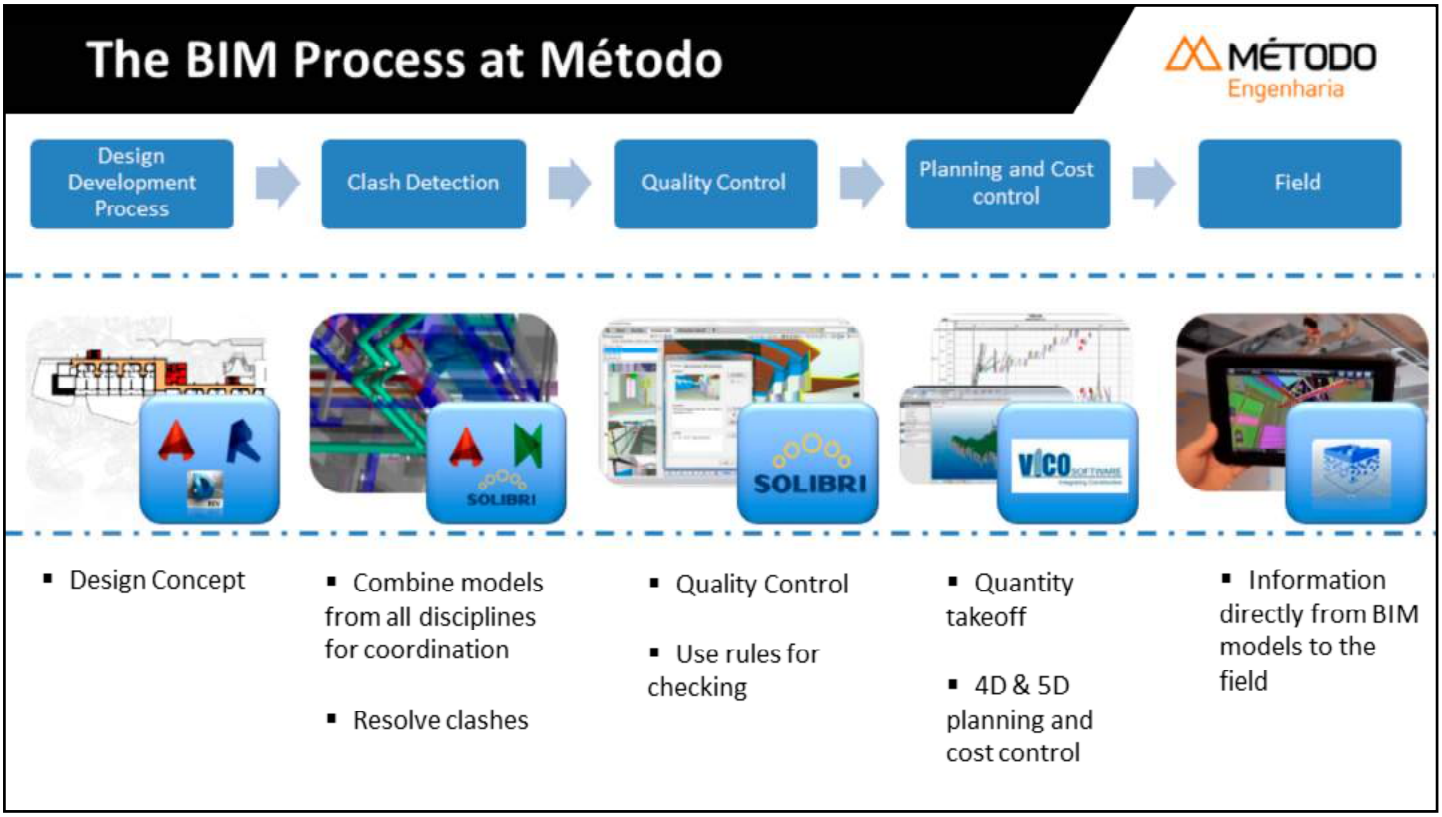
- Individual and group meetings (departments, directors, superintendents and managers) in order to:
  - Align scope and expected results
  - Collect department requirements
  - Overcome resistance to change

During each step of the BIM Implementation it was important to us to align the scope and expectations of all stakeholders regarding the necessary changes in the processes in each department.

For that purpose, we scheduled individual and group meetings with directors, superintendents, managers, and other professionals to collect their requirements and to explain the implementation goals.

At the beginning, some professionals didn't understand why it would be important to them to change the way they work, but during the meetings we helped them to understand in what ways the new processes could help them to work more efficiently, and overcome resistance to change.

Currently, we have a lot of professionals who are convinced of the benefits of using BIM at Metodo.



We use different kinds of softwares in our processes.

During the design development phase, we usually contract consultants specialized in/ who work with Revit, and we use the same tecnology to extract the information we need from the drawings and to perform critical analysis.

After receiving the drawings from the consultants, we integrate models from each discipline in a Federated Model and use that to run the clash detection process in order to resolve clashes by using Solibri or Navisworks.

We use Solibri for conducting quality control procedures of the models and for making sure they suit the requirements for quantity takeoff and Planning and Cost Control in VICO.

And on the field we are introducing the use of tablets to acess the drawings and information from the models.

Another important aspect of the BIM Implementation is to train professionals in the use of new software and processes.

At the beginning, the implementation and use of the BIM Technology were done exclusively at the BIM department. In this way, professionals were trained and they could dedicate most of their time to learning how to use the BIM tools and this new technology.

Recently, the company has become more confident about the new processes and our goal now is to train professionals in all departments in the company: project, planning, cost as well as on the construction site.

For this purpose, we scheduled classroom trainings to improve the employees' skills in both concept and BIM tools. Also, we included the BIM training program at Metodo Corporate University, where each professional can access a variety of web-based courses to acquire knowledge of many BIM topics.

Case 1: Coordination and Clash Detection

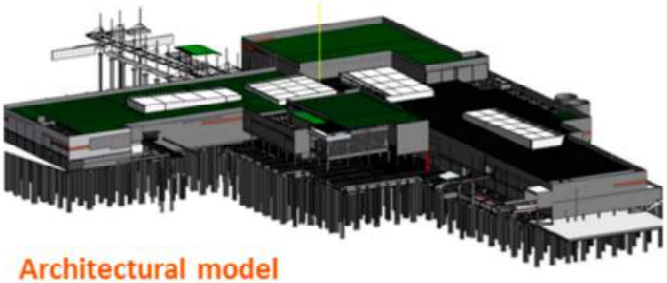
Now I would like to share with you three cases of the BIM use and the results we achieved.

(Now you will see two examples of the BIM process in action):

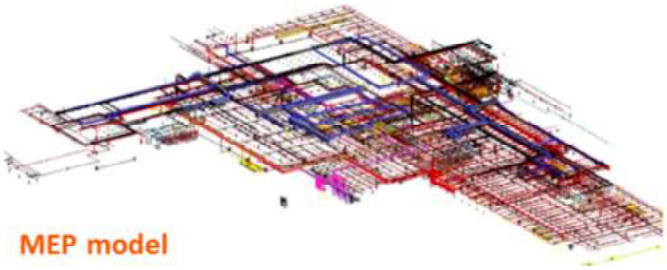
I'll start with Coordination and Clash Detection in a Shopping Mall...

The project

MÉTODO Engenharia



Architectural model



MEP model

Shopping Mall

- **Size:** > 90,000 m²
- **Number of levels:**
  - 2 basements
  - 2 floors + buiding coverage (tecnical area)
- **BIM Use:** Coordination and Clash Detection
- **Architectural Model:** by an architect
- **Other disciplines:** BIM service provider
- **Process:** Parallel
- **Clash detection analysis:** Método

We have been working on this contract since 2013.

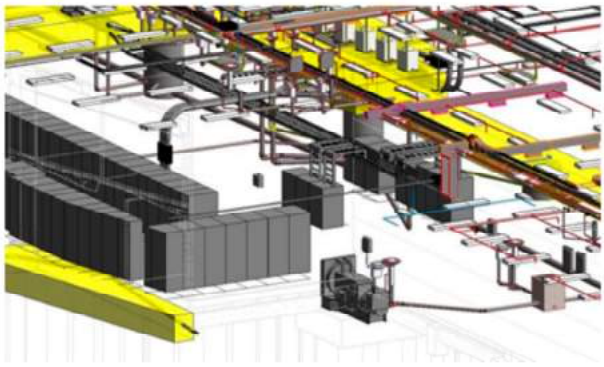
It is a 90,000 m² Shopping Mall with 2 basements and 2 floors

The architectural model was made by an Architect but the other disciplines were modeled in part by a BIM Services company and part by a Método's BIM team with the purpose of running the clash detection analysis and identifying issues we couldn't see only with a 2D analysis.

All the critical analysis of the project and the proposed solutions were made by the Método's BIM team together with the consultants and the client.

The project challenges

- Fast track project – design and construction phase overlap
- CD phase – MEP sub-contractors to develop the CD drawings
- High level of teamwork and collaboration across subcontractors and other disciplines required



MEP model

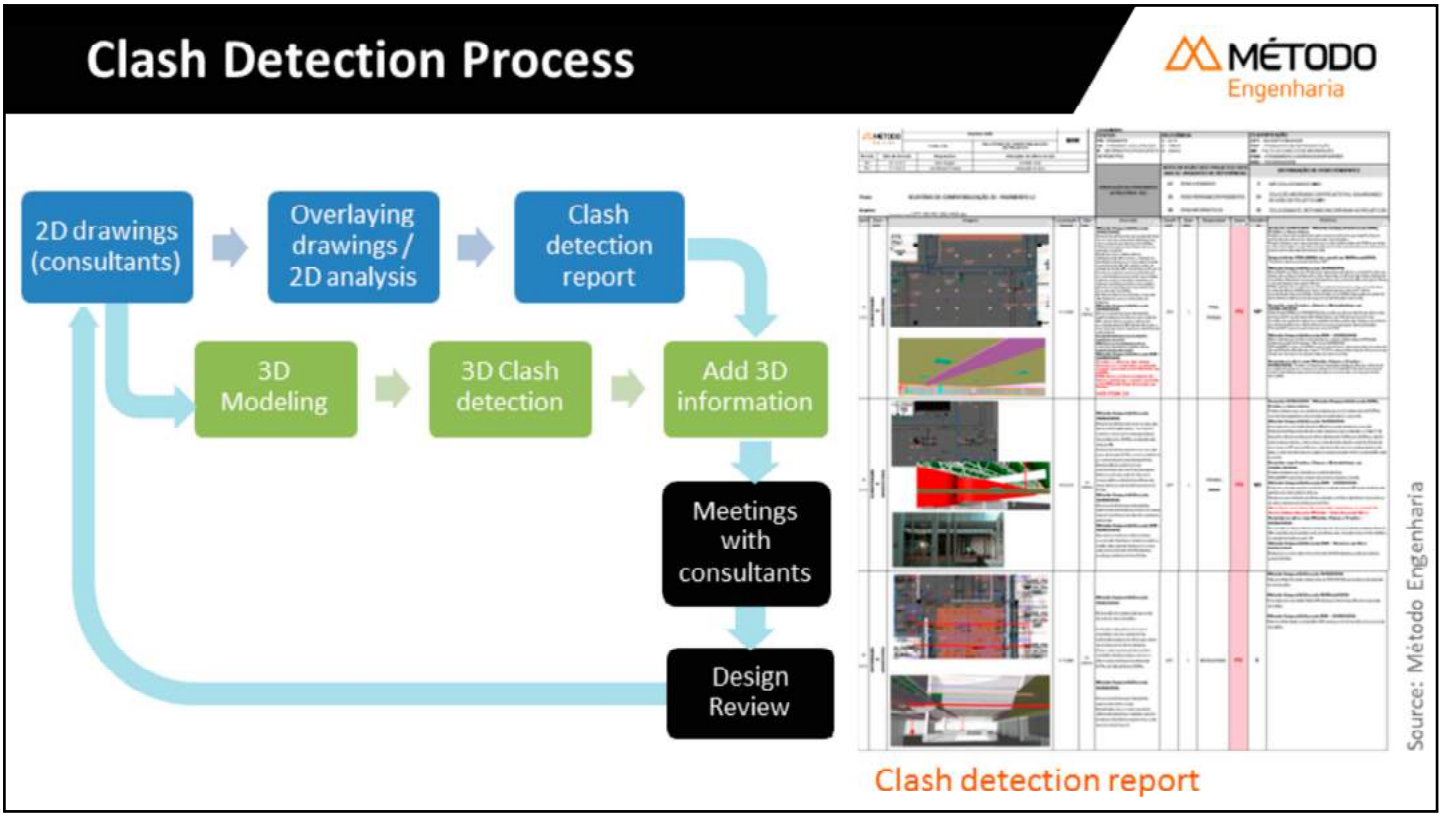
This project presented some challenges:

When we started the construction, the (CD) construction drawings were not finished and we had an overlap between the design and construction phase.

Typically in Brazil the MEP consultants are responsible for the construction drawings, but for this project, at the CD phase, we decided to contract the MEP Subcontractors to prepare the Shop drawings and this changed all the workflow we usually employ.

Also, this cenario required a high level of teamwork and collaboration across subcontractors and other disciplines; consequently, BIM was useful because it helped us to improve the communication and collaboration between members of the teams.

- Delay of MEP subcontractor to deliver the first version of the project
- Delay to receive the answers from other disciplines



In (this context/ a fast track project with part of the 3D modeling made by a external company), in each deliverable of the project we decided to run the 2D analysis in parallel with the 3D modeling to identify additional issues we weren't able to indentify only with the 2D analysis.

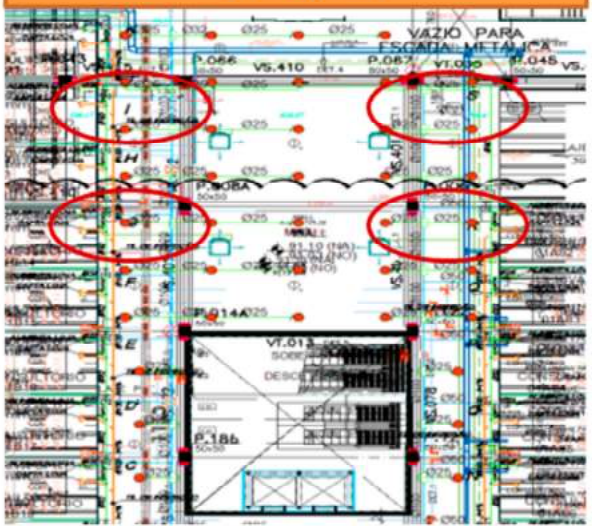
All the issues identified were reported in a clash detection report.

In a meeting with the consultants and the client, we used the report to show the clashes and the solutions proposed and to discuss individual responsibilities for changes in the project.

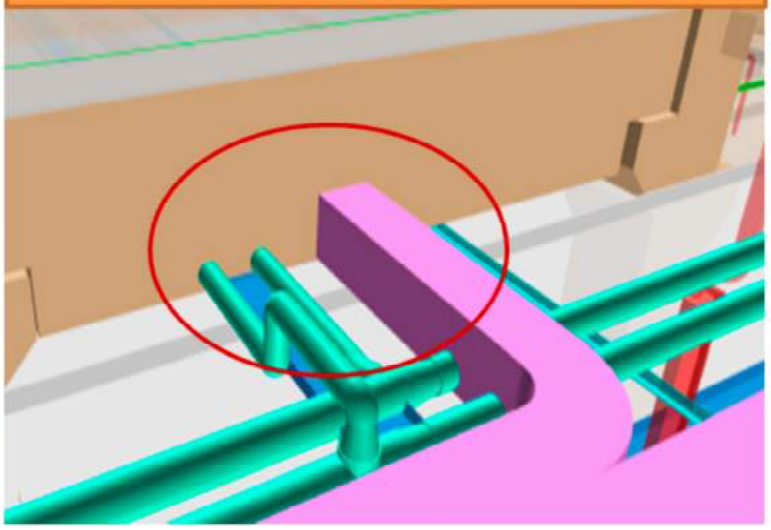
MEP SYSTEMS X STRUCTURE

MÉTODO Engenharia

As Designed



BIM Model



2D Overlay: is not sufficient to demonstrate the necessary space for installation.
3D Model: considering the vertical space designed, and the real dimension of ducts and pipes, there would be conflicts between installations and the concrete beam.

Sobreposição 2D: não permite visualizar a indisponibilidade de espaço para as instalações no entreforro.
Modelo 3D: considerando alturas livres especificadas no projeto e as dimensões reais da tubulação, haveria conflito entre as instalações e a viga.

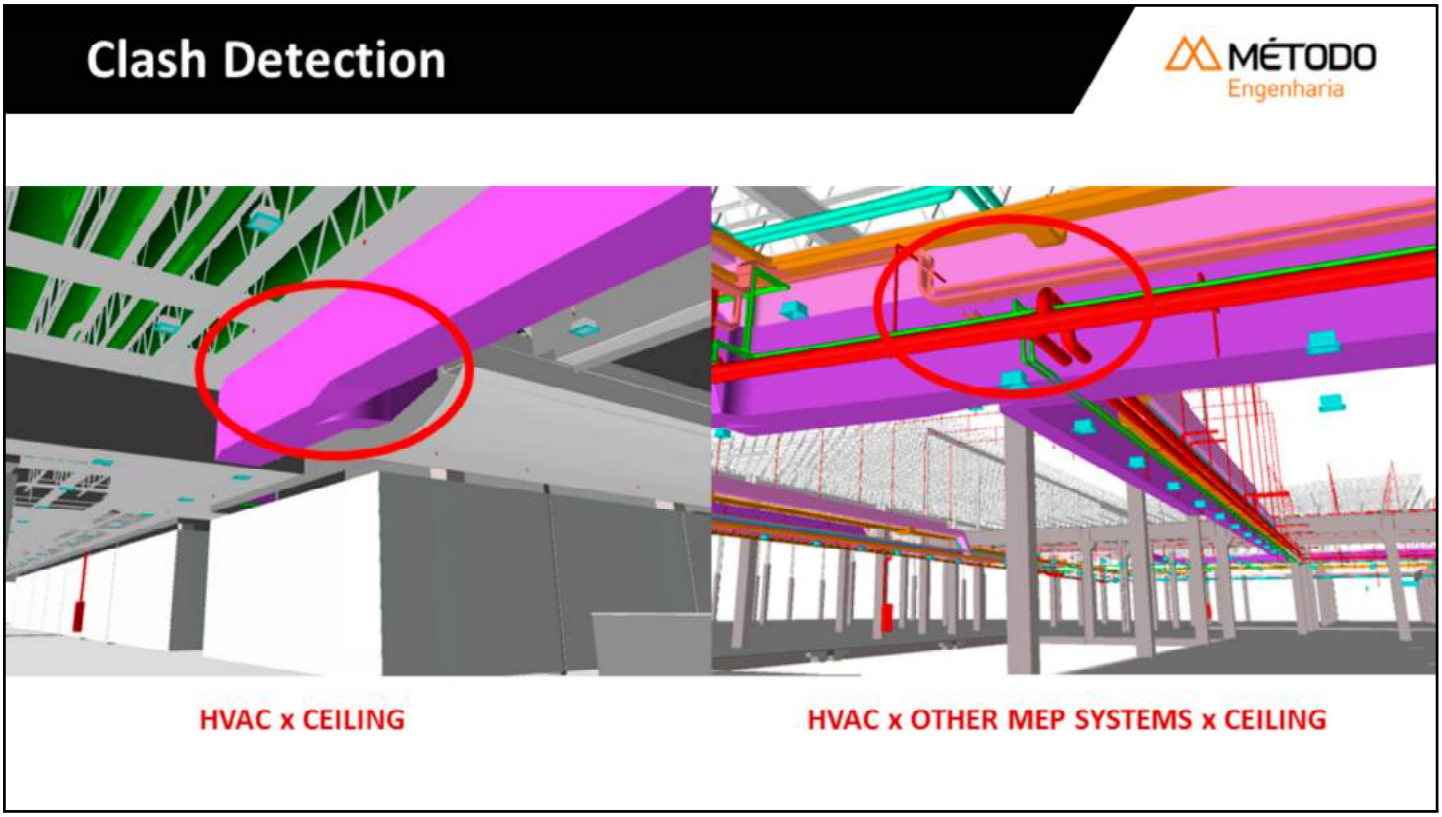


IMAGE 1: The dimension of ducts clashed with the intended celing height.
IMAGE 2: In order to keep the intended ceiling height, HVAC ducts would clash with other installations.
SOLUTION (no image): The solution was to work with the ducts height X width to fit the space between ceiling and roof, but an adjustment in ceiling height was inevitable.

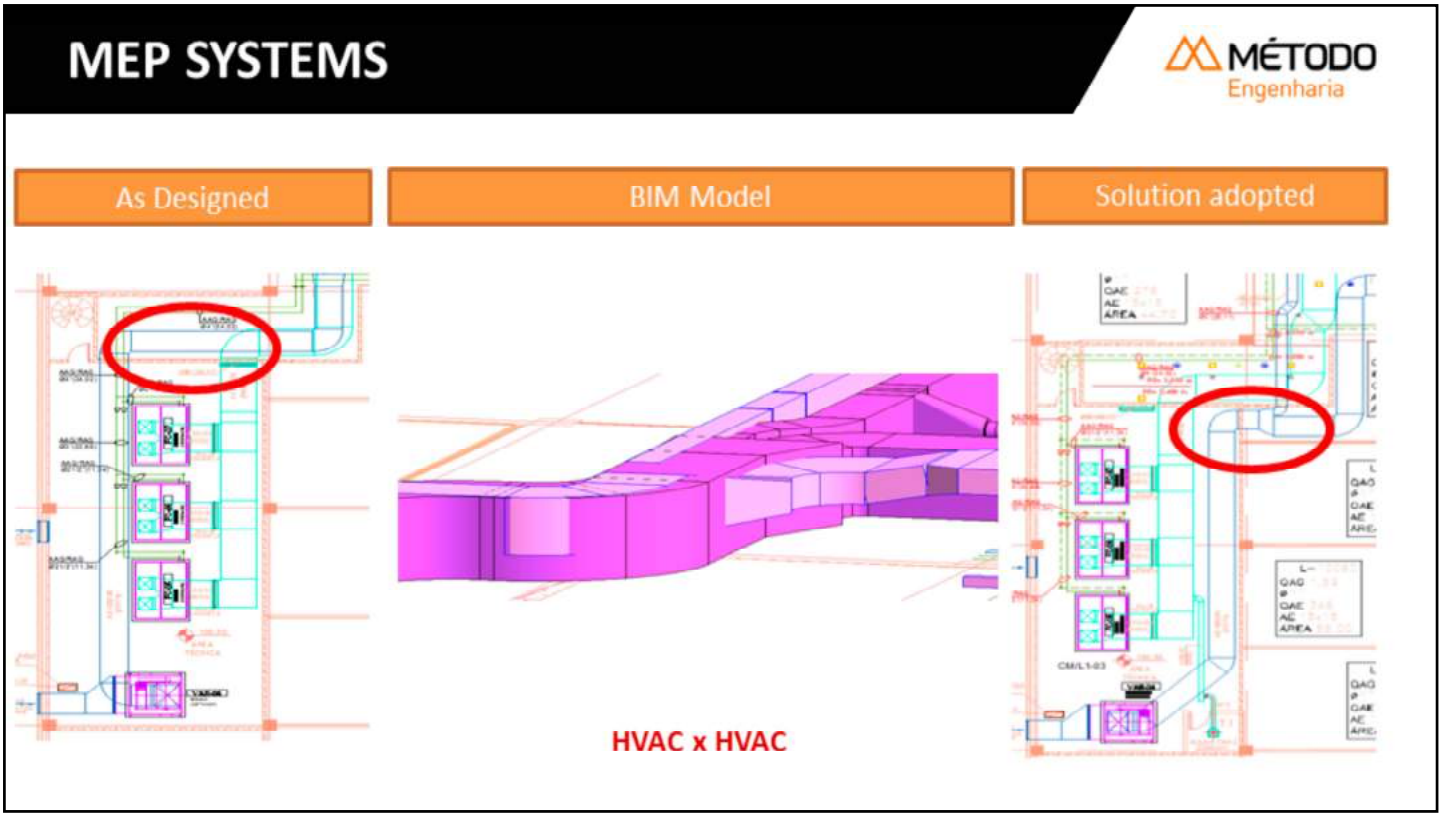


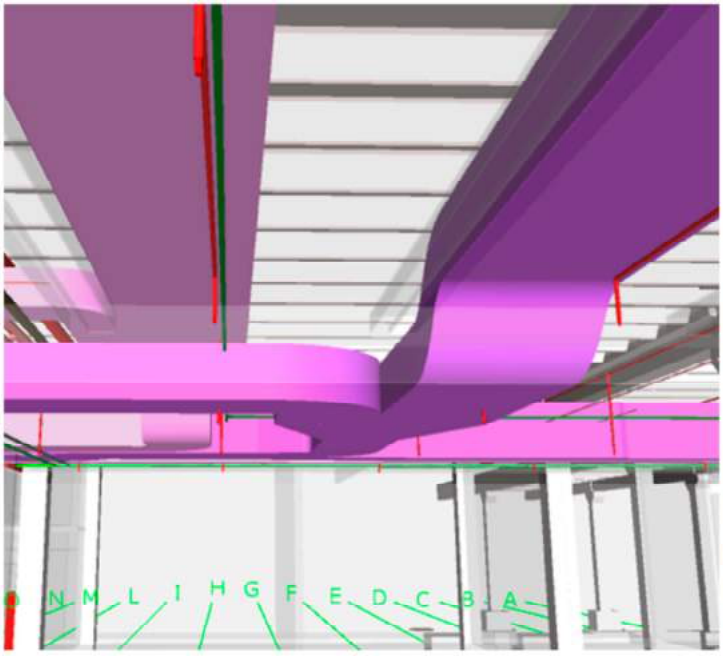
IMAGE 1 – 2D DRAWING: 2 HVAC ducts occupy the same space, considering that they would be one above another.

IMAGE 2 – 3D MODEL: Considering the designed ceiling height and roof, there's not enough vertical space for both ducts (dark pink and light pink overlayed)

IMAGEM 3 – 2D DRAWING: The proposed solution places/relocates the ducts in the horizontal space side by side.

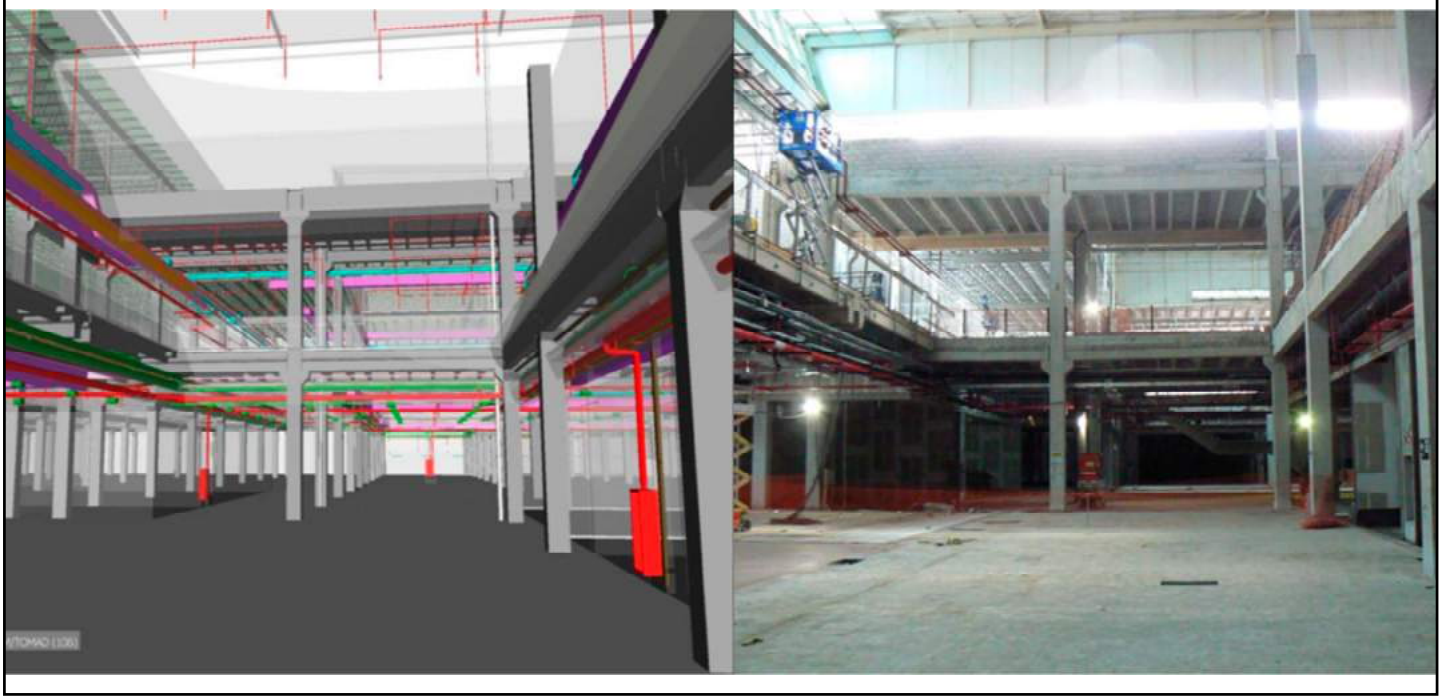
MEP SYSTEMS

MÉTODO Engenharia



Model x As Built

MÉTODO Engenharia

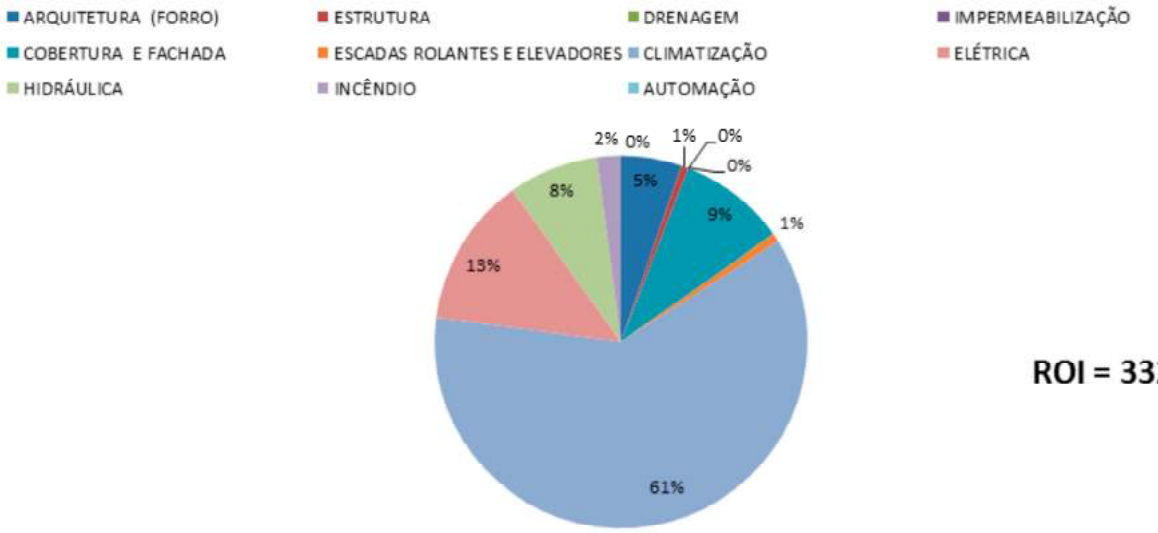


See the MEP systems as built and their final distribution as we predicted using the BIM model (as visualized in BIM)

Results

MÉTODO Engenharia

Issues: Disciplines x impact in cost



ROI = 332%

175 interferences detected and solved before construction!

As a result, we were able to identify 175 critical issues and solve them before construction, preventing waste and avoiding rework.

In each case we estimated how much it would cost if we hadn't solved the problems before construction. (We did this analysis by comparing the historical data we have).

"We achieved savings of more than E$ 250 K".

We also analysed the impact in cost in each discipline:

The most costly clashes in this project are:

HVAC -- the most costly, followed by plumbing, electrical and facade.

This information is useful in order to prioritize disciplines during the critical analysis.

Benefits

- Better vizualize the project: eliminate misinterpretation
- Concentrate information and easy access
- Facilitate communication between coordination and design teams
- Assist decision making
- Avoid rework at field

- Better vizualize the project: eliminate misinterpretation – BIM makes it easy to see where each duct runs as well as its correct dimensions. Consequently there is little room for misinterpretations.
- Concentrate information and easy access – Important information regarding all disciplines is readily available, so projects can be developed faster and more efficiently.
- Facilitate communication between coordination and design teams, Assist decision making – Since coordination and design teams have easier access to information, less time in spent in the decision making process.
- Avoid rework at field – By solving most issues before the construction phase begins, it is possible to avoid rework at the field and maximize efficiency by delivering the building before contractual deadlines.

Case 2: BIM Design Process

Now I would like to present a case about the ways Método deals with the BIM Design Process, handles the role of the various players in the design and construction phases, and guides the development of the project by applying the BIM uses we defined in the beginning of the project.

The project

MÉTODO Engenharia

OSASCO'S NEW CITY HALL

- 19-story office building
- 2 basements - 500 parking spaces
- Ground Floor (auditorium, restaurant, theater - 700 seats)
- Size: 40,800 m²

BIM USES

- Design Development
- Design Review
- Planning and Cost 5D

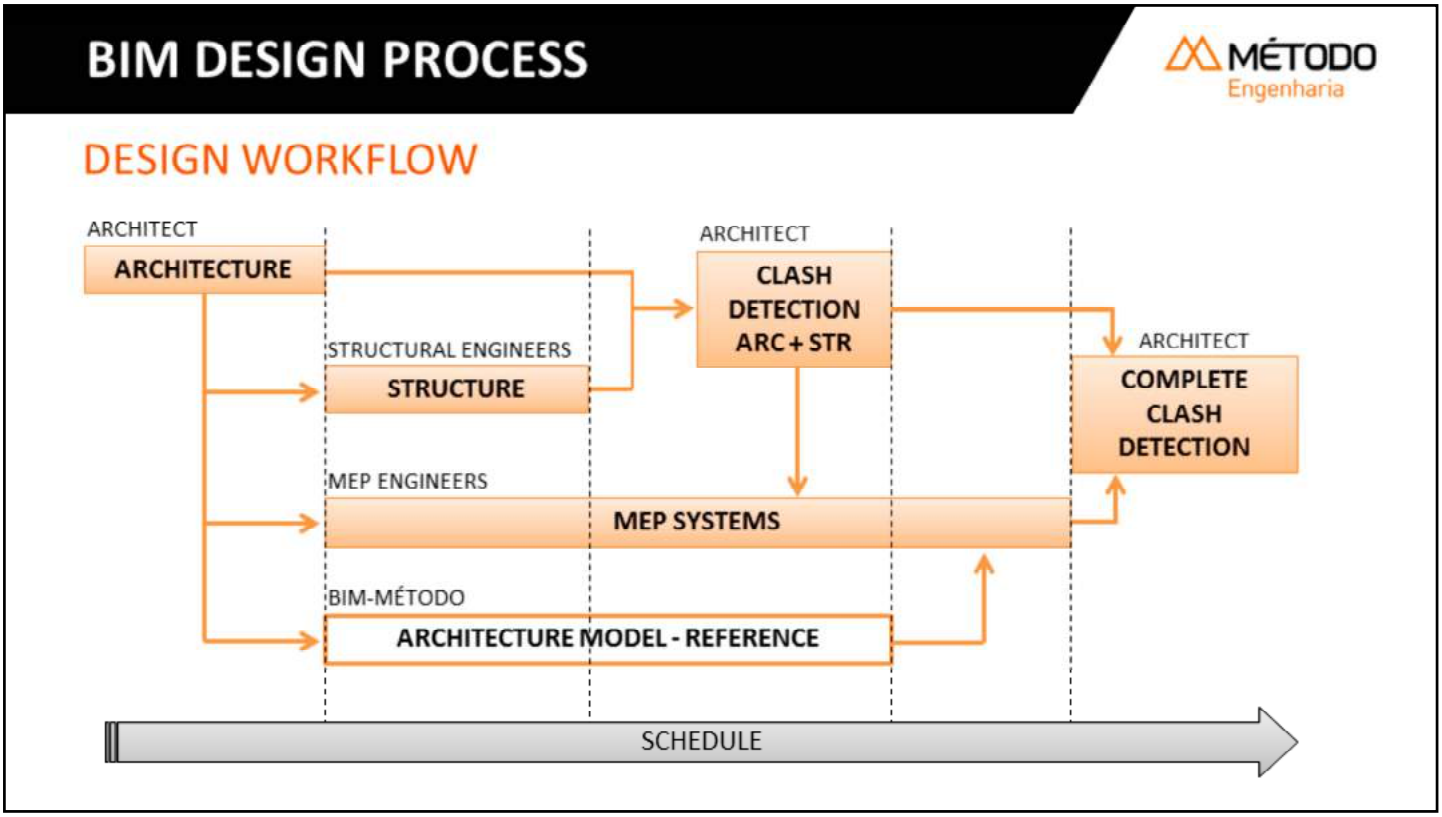
We have been working on this contract since last year...

It is the new "CITY HALL OF THE CITY OF OSASCO".

It is a 40,800 m² building with 2 basements, 19 office floors and a ground floor with (auditorium, restaurant, and a theater with a capacity of 700)

We used BIM in this project during the entire design development process. We are currently using the model in the 5D process for planning and cost control.

The most important part we have to prepare for each project development by using BIM is the BIM Execution Plan, with the BIM goals, BIM strategy, workflow, and the procedures that all the stakeholders have to follow during the project development, including the level of development required for each component in each phase of the project.



In this project, the MEP (Mechanical, Eletrical and Plumbing) model and the Structural Model were prepared by the consultants, but the architectural model was modeled by the Método's BIM team with the purpose of being a reference for the other consultants to develop their projects. The complete clash detection run is made after all the models are available.

We did this because in Brazil most consultants do not use BIM. Sometimes, there is a previous relationship between the **consultant/projetists/designers** and the owner. In this case, the architect is responsible for obtaining a (building permit -- aprovação do projeto na prefeitura) and we are not allowed to recommend another architect who employs the BIM methodology.

We have been working hard, and during all the phases of this project, the communication and discussion of the solutions of the project happened by using the models.

Or... (we have used the models for communication and discussion of solutions)

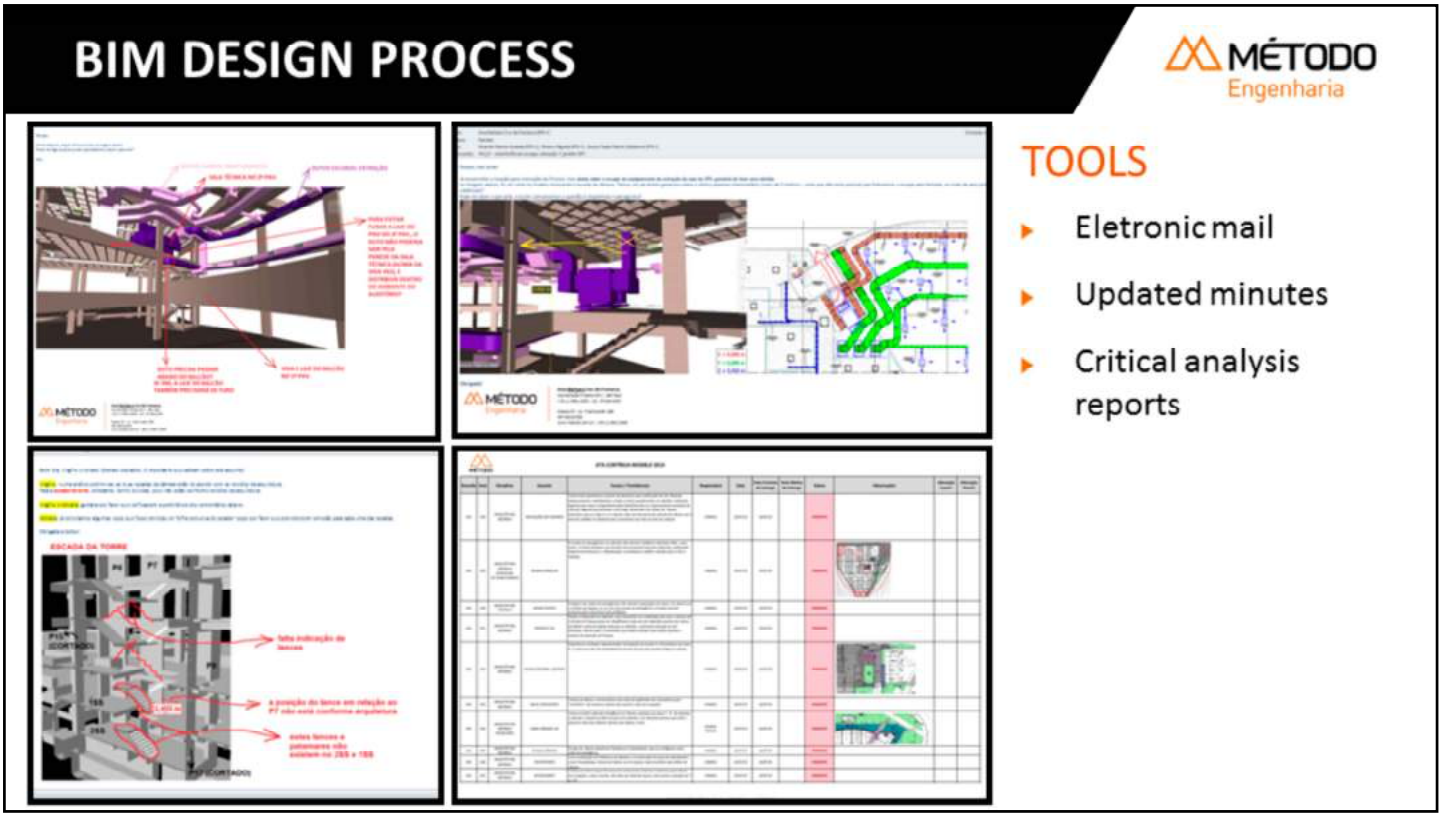
BIM Coordination Meetings

MÉTODO Engenharia

- Weekly meetings with the design team

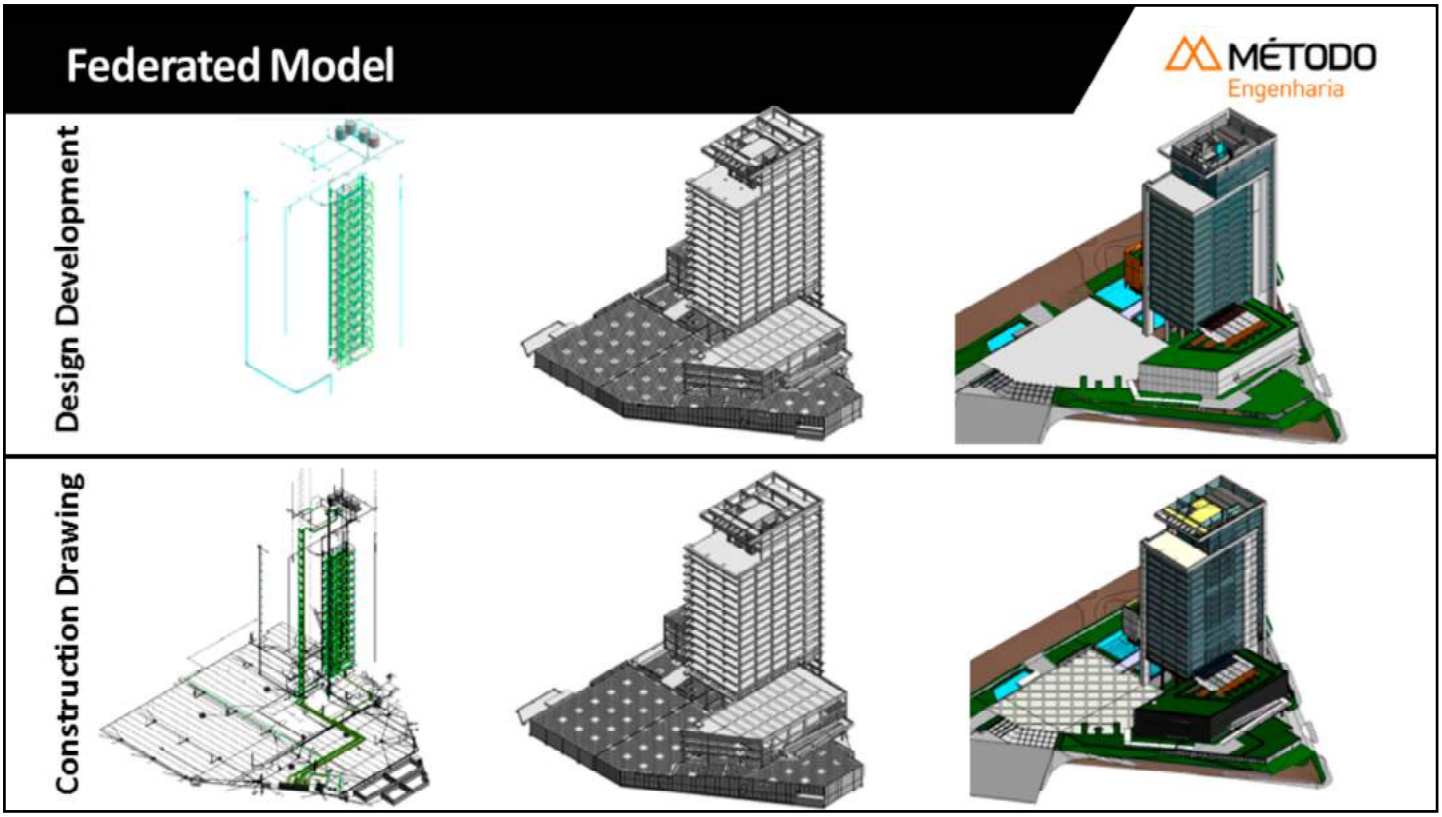
We have scheduled weekly meetings with all the disciplines teams to discuss the project and consider the issues, which each one of the consultants have previously identified.

These “dynamic” meetings lead all staff, including the consultants who are not developing their projects in BIM, to discuss their content by interacting with the coordinated model.



The issues are also discussed via eletronic mail, and finally reported in formal documents.

This facilitates communication and helps to tackle (to deal with) issues, discuss them anytime during the development of the project, not only at the weekly meetings, causing the process to flow smoothly and develop faster. *(Isso facilita a comunicação e garante que os problemas sejam discutidos diariamente conforme evolução do projeto, antes mesmo das reuniões semanais).*



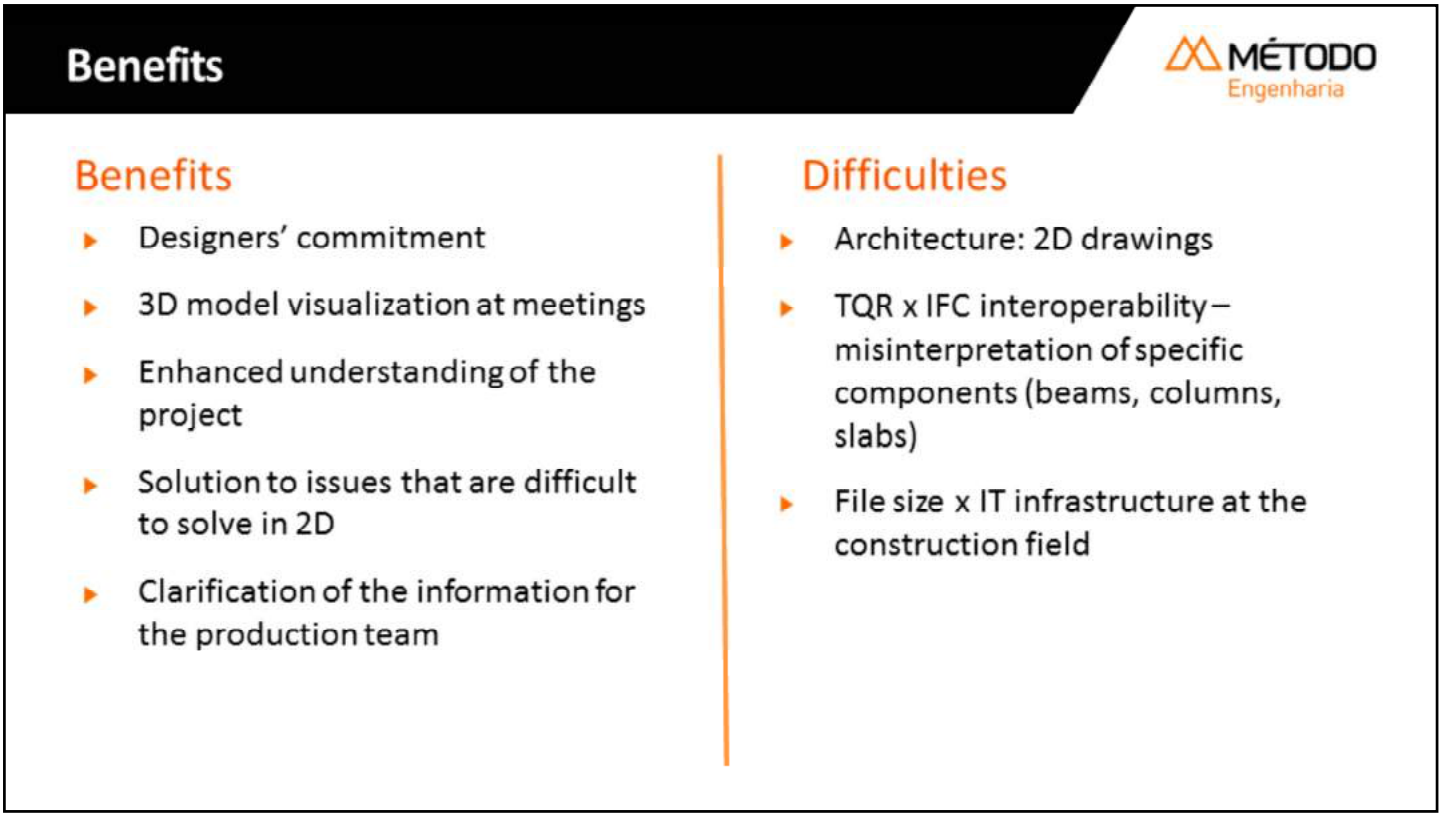
We have just finished the Construction Drawings. It is possible to see the evolution of the level of development of the model between the Design Development and the Construction Documents phases.

All the documentation has been extracted from the model. We started the site work last May.

Here is a picture of the field as we stand right now.

The model now is being used for 5D planning and cost control using VICO Software. We also plan to use this model during the entire construction phase... I will explain this concept and the way we structured that in the next case.

We are also planning to delivery it as an “As Built Model” for the owner to be able to use it in the operation and maintence phases ...



So far we have achieved the following benefits:

➢Designers' commitment: In depth Project discussion. All of them focus on the integration of disciplines. Focus on team performance is based on open and direct communication among all participants.

➢The 3D model is visualizated during the meetings: the discussions using the 3D model provide a better undestanding of the project: it improves communication and helps the team to work together to resolve the spatial relationship between components.

➢Solutions to issues that are difficult to solve in 2D: identification and solution of problems before the construction begins

➢Clarification of the production team's doubts: the models are being used for the production team to better understand the information in the project.

We also had to handle some difficulties:

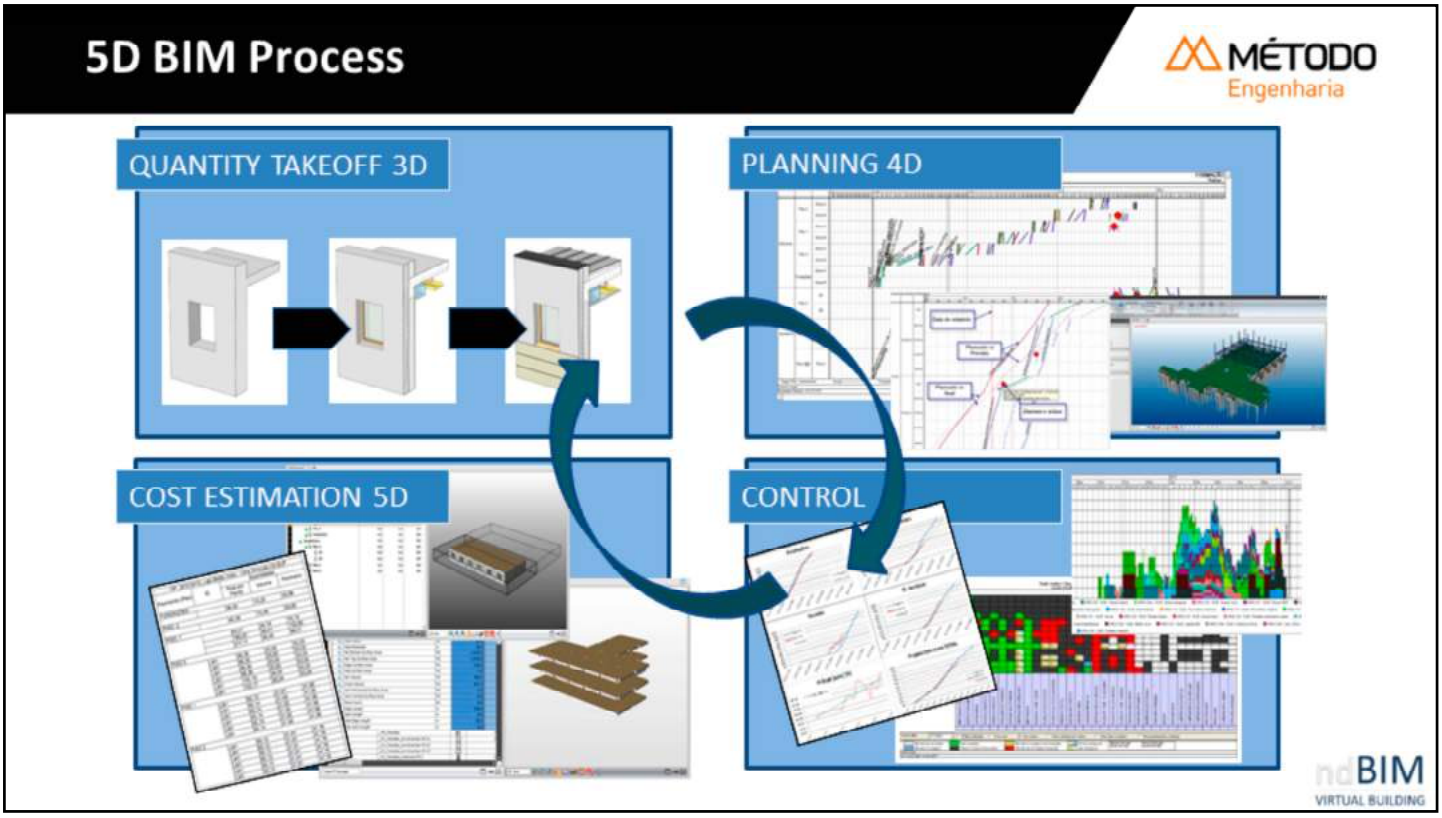
➢Architecture: 2D drawings – We know that in an ideal scenario it is important to have all the main disciplines in BIM. In this case, because we had to develop the architectural model internally at Metodo, we had to develop a process to handle this during the evolution of the project... We included the time for developing the model from the architectural 2D drawings in the workflow.

➢TQR x IFC interoperability – The TQS is a file extension of the main structural analysis software in Brazil... We can export the 3D model from this software to IFC, but there is frequent misinterpretation of specific components (beams, columns, slabs), so, we need

to solve these issues in Revit before creating the Federated Model.

- File size x IT infrastructure on the field – In Brazil the IT infrastructure on the construction field sometimes faces challenges regarding Internet connections, and exchanging models with the consultants might take longer than expected.

In 2014 we started the 5D Implementation and we achieved the following results:

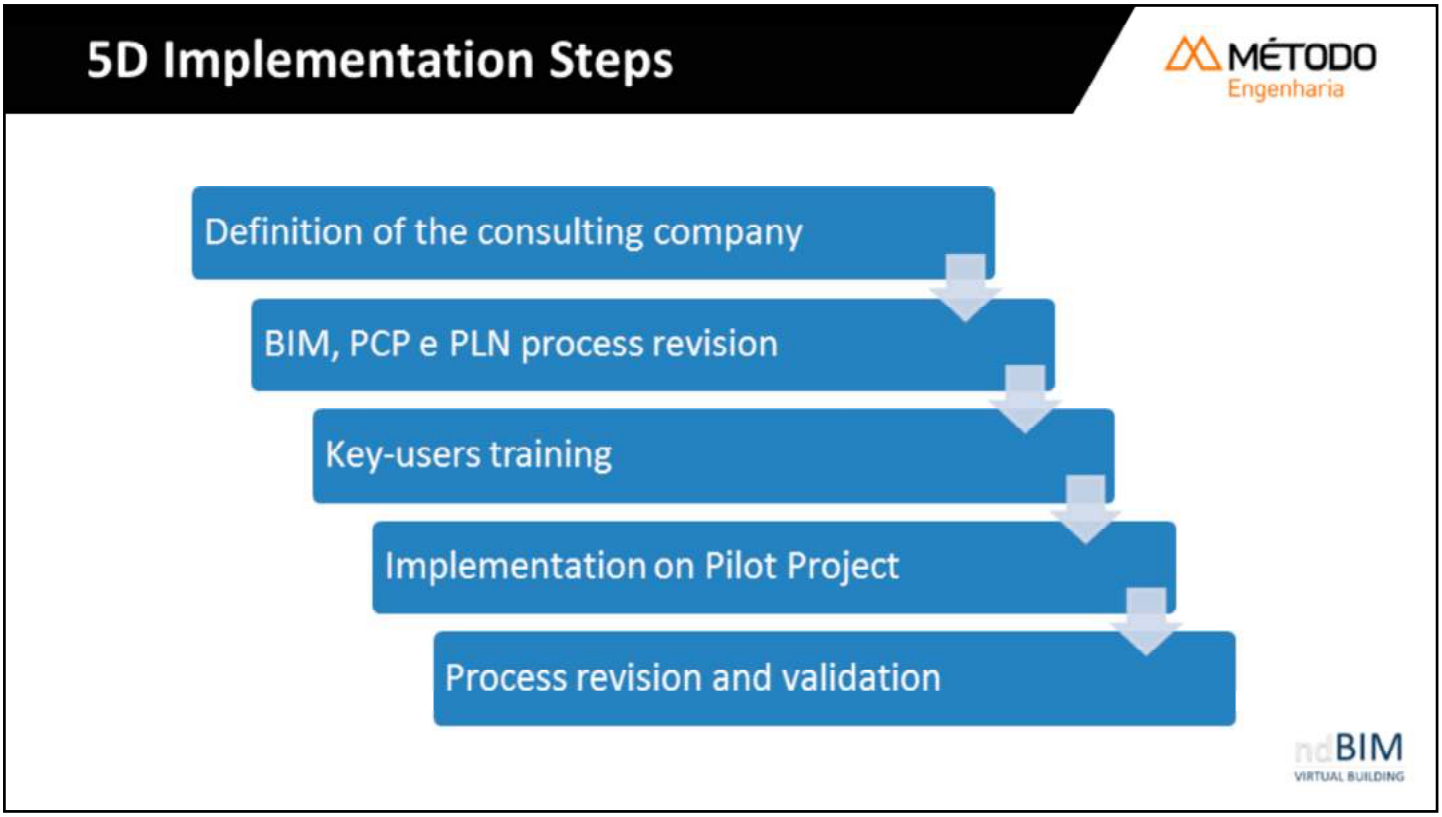


What would be our purpose implementing the 5D BIM?

In the tradicional planning and cost control processes there are no specific tools to integrate data from different sources. There was information loss, rework, and overwork to achieve performance indicators.

With the 5D process, we aim to be able to integrate all the information we extract from the 3D model with cost and planning information. (Furthermore / Moreover / Also) use this information for planning and cost control.

Also, with this technology, whenever there are changes in the scope of the project, we are able to analyse their impact on costs and time; consequently, we are able to improve management efficiency.



The first step of this implementation was the decision to contract a consulting company to guide us in the 5D implementation.

We are looking for a consulting company to guide and help us to implement this process more quickly.

We decided to contract ndBIM because we are interested in VICO Software and because they have previous experience in implementing the 5D process in a construction company such as Método.

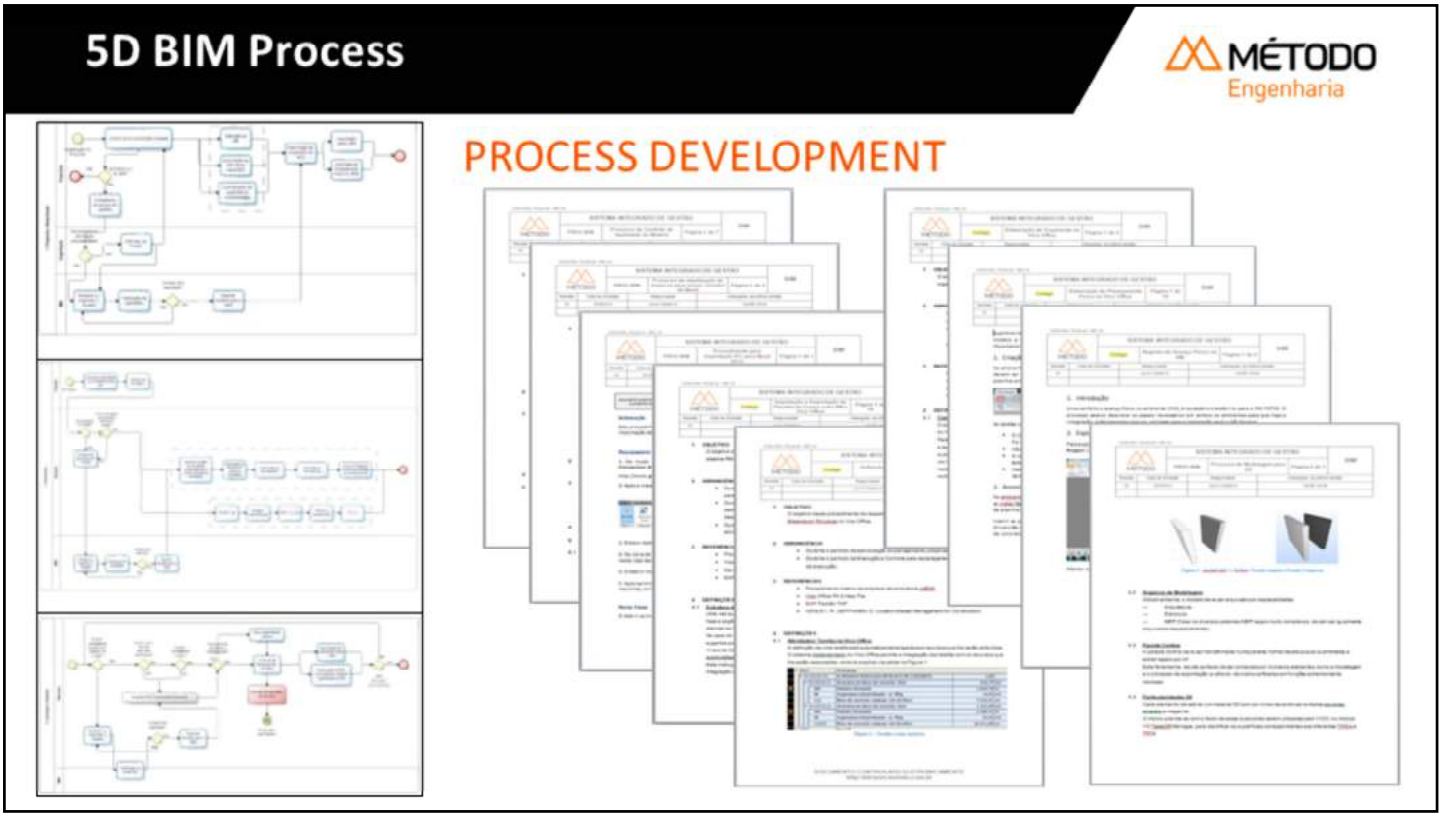
They helped us to develop the implementation plan, which consists of:

•Revising of tradicional processes to suit the 5D process

•Training key users to help us in the implementation

•Implementing the Pilot Project

The results of this project will be used to validate the processes developed.



Three departments were involved in the revision process:

The BIM department (responsible for the BIM procedures)
PCP (production and planning control) (which is) responsible for the procedures and best practices for planning and cost control applied in our contracts
And the Proposal department, which is responsible for developing the schedules and budget and replying (RFP – request for proposals)

All that work was done in the first semester this year.

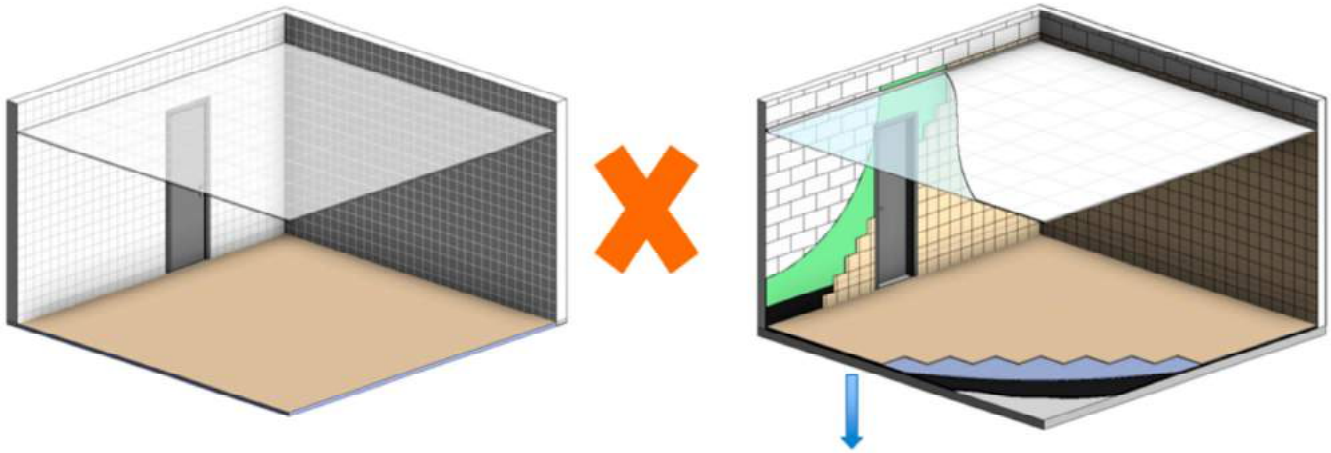
5D BIM Process

MÉTODO Engenharia

Level of Development to 5D control

Design Model

Construction Model



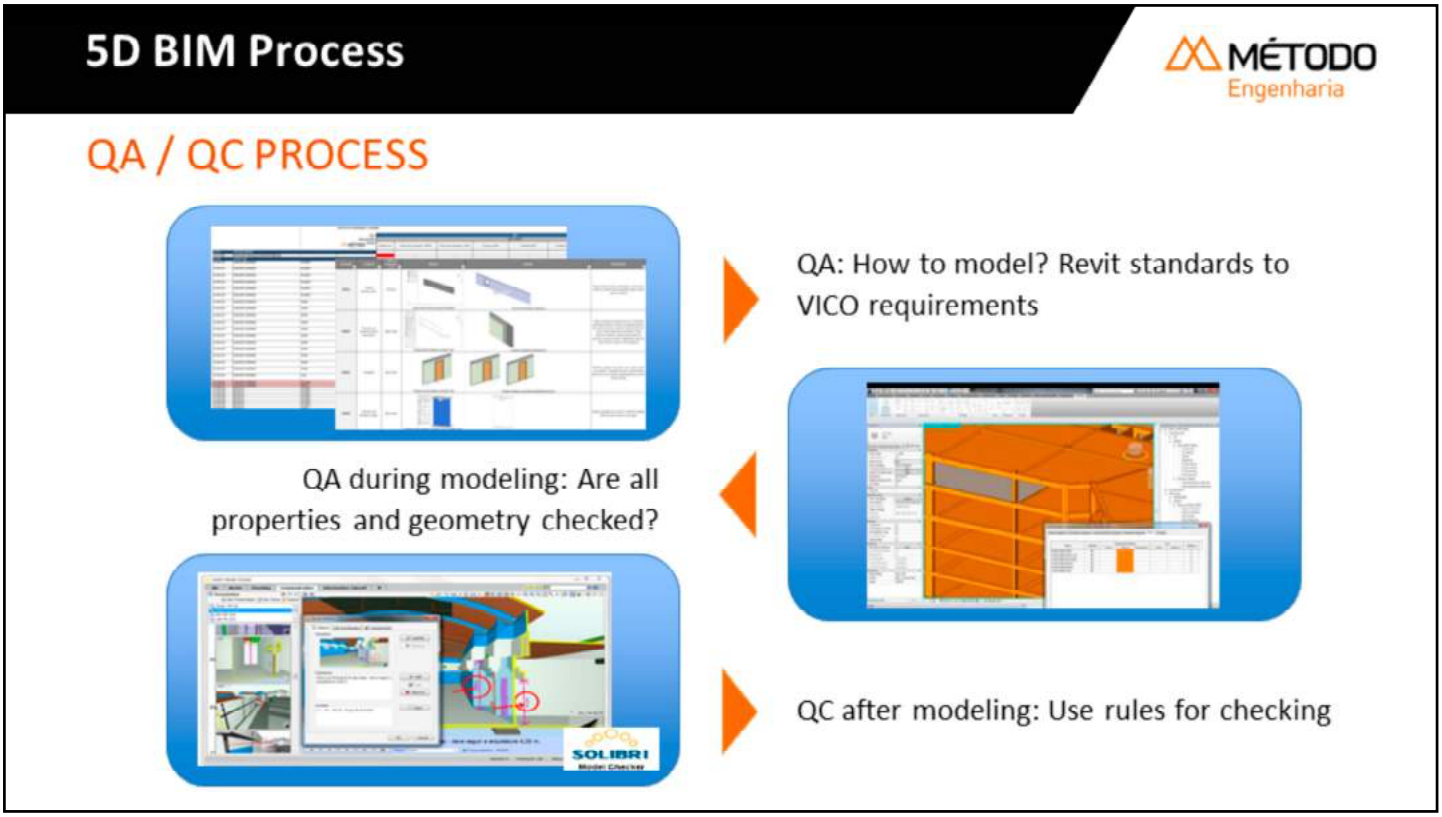
The diferent types of finishes: defined and modeled

Source: Método Engenharia

It is important to decide which level of development of the model is necessary to make the 5D control possible.

Usually the model from the design team has a low level of detail and it's important to us to update this model to suit the requirements for planning and cost.

The model for quantity takeoff has to have all finishes layers defined and modeled. At this moment we have an internal BIM team to update this model to suit our process.



It's important to pay attention to the quality of the information in the model to extract precise information for planning and cost control.

QA: How to model? Revit standards to VICO requirements --- First, we have to make sure the standards used in a design authoring tool can be read in the 5D software

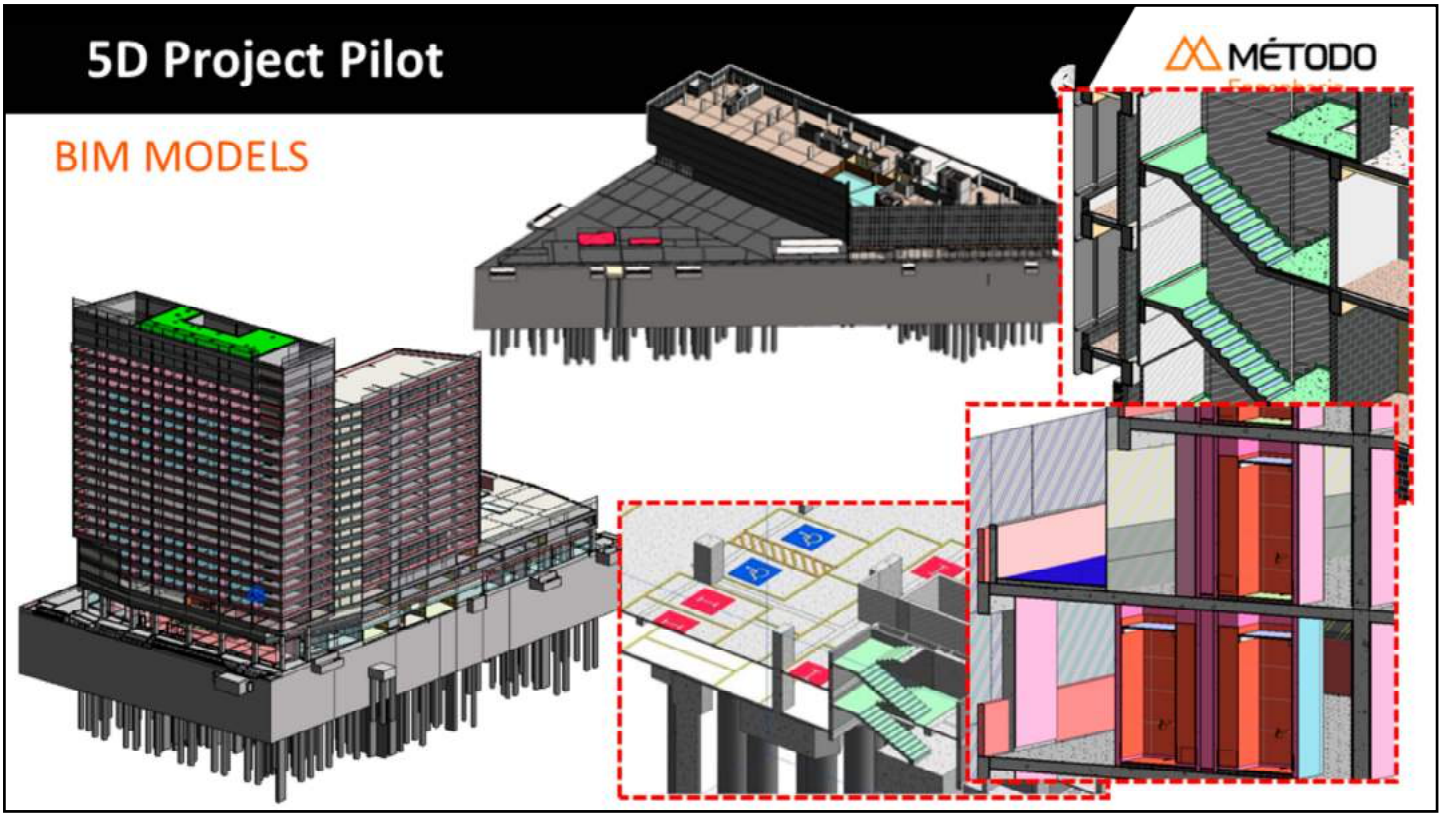
QA during modeling: Are all properties and geometry checked? --- During the modeling it's important to check if all the properties and geometry are correct.

QC after modeling: Use rules for checking --- And after the model is complete, use rules for checking if all the requirements were considered.

quality assurance (*QA*), quality control (*QC*)

Quality Assurance is *process* oriented and focuses on defect *prevention*, while **quality control** is *product* oriented and focuses on defect *identification*.

QA is a set of activities for ensuring quality in the processes by which products are developed.



We applied this process in a project pilot. We received the model from the consultants and updated it with the information required to use it to planning and cost control.

In that image you can see the details of the parking signalization.

As you can see…we detailed all the finishes to fit the cost requirements

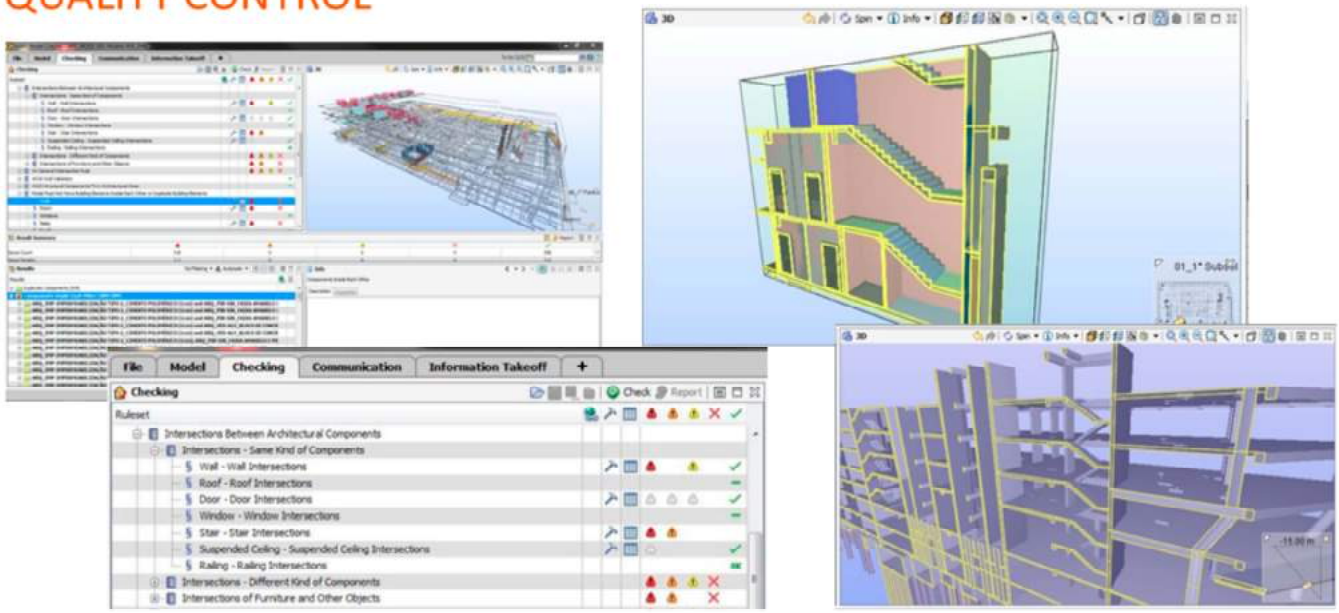
Here you can see even the stairs details are represented in the model.

And in this picture you can see that the ceiling has the (….) modeled and the finishing in the bathroom walls goes 10 centimeters higher than the ceiling. Also we have the insulation materials modeled.

5D Project Pilot

MÉTODO Engenharia

QUALITY CONTROL

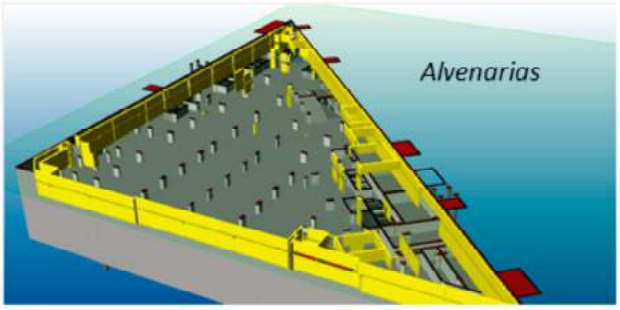


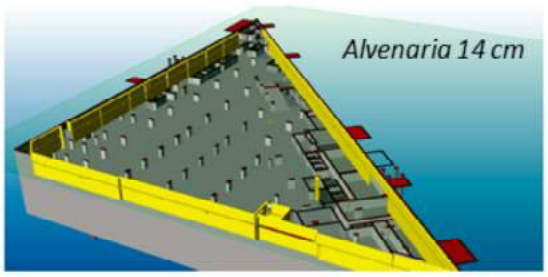
We checked the quality by using Solibri to run rules we prepared based on all the requirements as you can see in picture in the bottom left corner. They checked the intersections between components and properties.

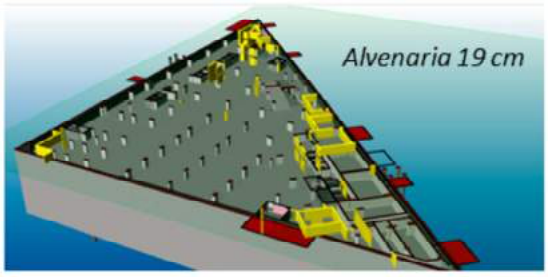
Scope control

MÉTODO Engenharia

Visualization







With the 3D views, it is easy to verify what is the scope considered in the project and in the contract.

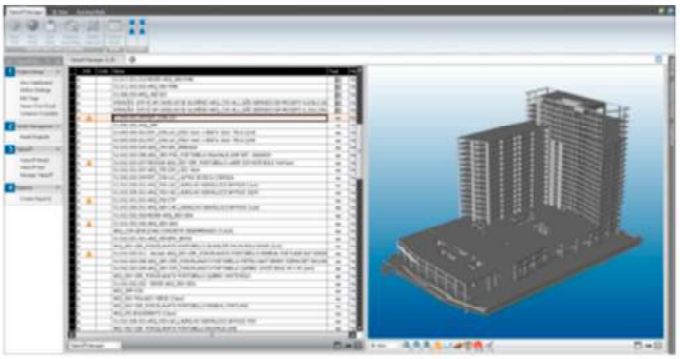
1)Revisão de todas as dimensões para a montagem do cronograma.
2)Todo o Escopo é planejado, ou seja, uma vez que devo mapear todos os Serviços/Escopo da Planilha de Custos nas tarefas a serem executadas, não deixo de planejar nenhum Serviço da obra.

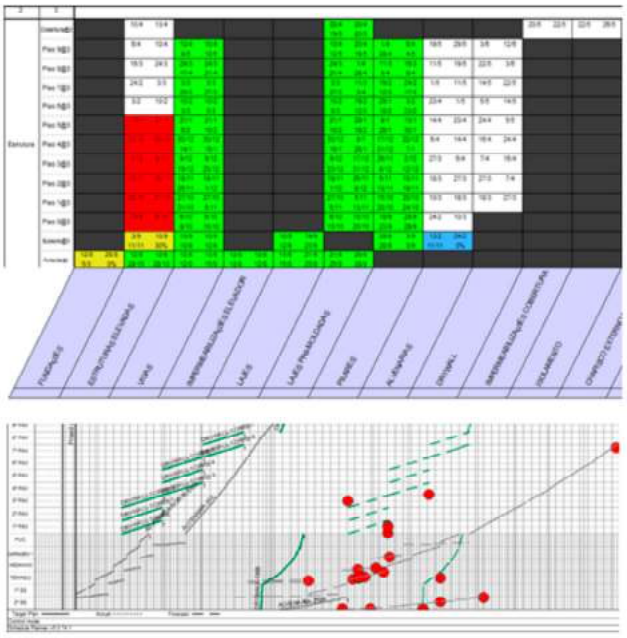
•Quantidades por setor – auxílio na programação por setor, setores críticos e medição
•Base para a PST – programação com subempreiteiros (o quê? e onde?)

5D Project Pilot

MÉTODO Engenharia

SCHEDULING AND COST CONTROL





1) We used the information from the BIM Model and apply it to our planning which makes the planning and cost control more efficient.

2) Acompanhamento do planejamento e do avanço das tarefas de maneira gráfica e intuitiva.

3) O registro do avanço físico semana a semana ajusta a produtividade segundo a realidade do andamento da obra.

Field

- Use of new technologies to optimize processes
- Make teams more available for control tasks
- Improve quality of execution with the prompt resolution of identified problems

In the field we are introducing the use of tablets to optimize processes

Make teams more available for control tasks --- they don't have to go to the office to get the information they need.

Improve quality of execution with the prompt resolution of identified problems --- clashes resolutions are available directly from the model.

Benefits

- More efficient and integrated planning and cost control
- Identification of issues and project flaws right from start
- More reliable and easy to track information
- More precise cost and deadlines estimates - mitigation of risks
- Change management process

As exposed previously we achieved important benefits, that we can summarize in:

- More efficient and integrated planning and cost control --
- Identification of issues and project flaws right from start -- At the moment we start to model, we are able to detect all the lack of information that could be only noticed when during execution.
- More reliable and easy to track information – All the information used in baseline can be easily identified within the model.
- More precise cost and deadlines estimates - mitigation of risks – by better understanding the project scope and the relationship between project activities, the company is able to plan its cost and deadlines more precisely.
- Change management process – while analizing change orders in the project we can identify its impact in the cost and schedule baselines.

To wrap up... I would like to talk about the next steps and new investments in the BIM Methodology.

MÉTODO Engenharia

How could BIM help us to transform jobsites into assembly lines, improve quality and raise productivity at work...?

After implementing and using BIM in the Design Phase and starting to use BIM for planning and cost control, we started to think about ways BIM could help us to transform jobsites into assembly lines and, consequently, improve the level of quality and productivity at work...?

As your CEO Hugo Rosa usually says: “No construction is better than its design!”

You should focus on the project and solve all the issues during the design process. The field is definitely not the place to resolve issues...

In our market, people don’t often dedicate enough time to developing projects before starting to construct. People often don’t realize that a solid well-developed project can reduce costs and boost the quality of the construction...

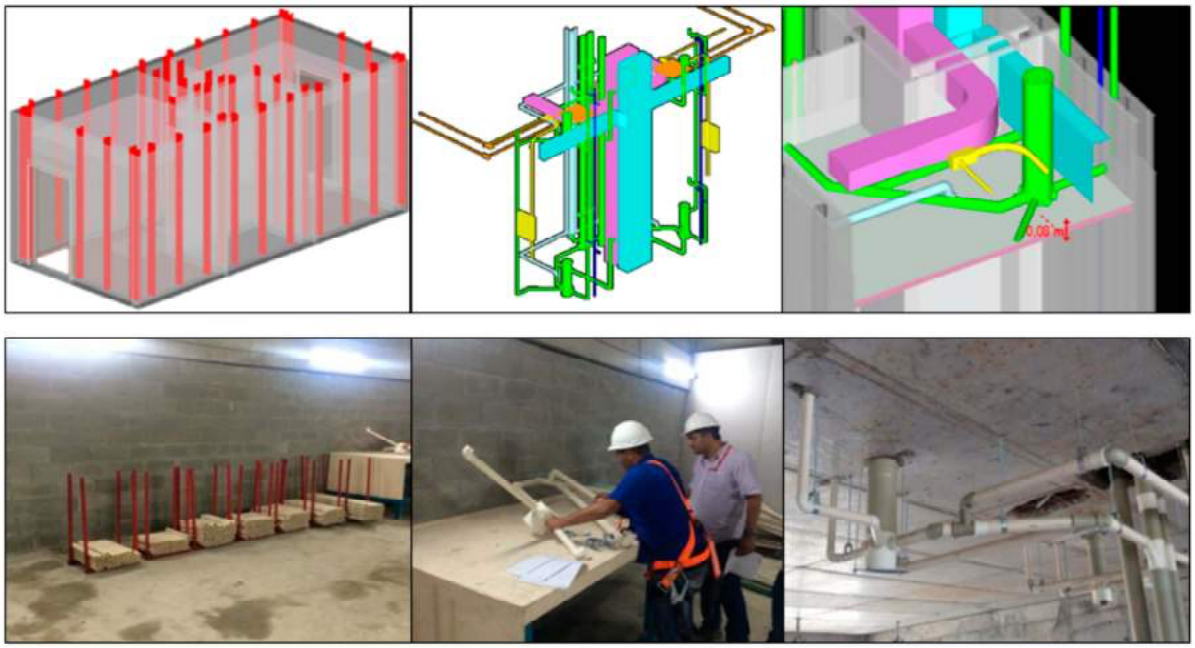
Committed designers and well-rounded/perfect projects can provide precise information during all the project development phases, which is crucial for tackling issues that would be otherwise too costly to be dealt with on the field.

“Muitas vezes, no nosso mercado, o projeto acaba sendo pouco prejudicado, mas além de contribuir para a redução do custo final da obra, a qualidade da obra em si, está diretamente relacionada ao nível de qualidade de seu projeto.
Se o projeto é mal feito e com poucas informações, normalmente acaba trazendo diversos problemas para as obras e é mais custoso reparar em campo, do que se investir no projeto e na contratação de bons projetistas”.

BIM x Prefabrication

We are investing now in transforming jobsites into assembly lines and applying more prefabricated systems.
To be able to apply more prefabricated systems it is important to have a good-quality project where all the issues are resolved before the construction phase. As showed before... We have achieved outstanding results by applying BIM in our projects.
But, no matter how good the project is , if we don't focus on the quality and control of execution, we will not be able to apply prefabricated systems.
For this purpose, we are investing in the research of new metodologies which help us to monitor the quality of the execution of the project.

Project Pilot - Mockup

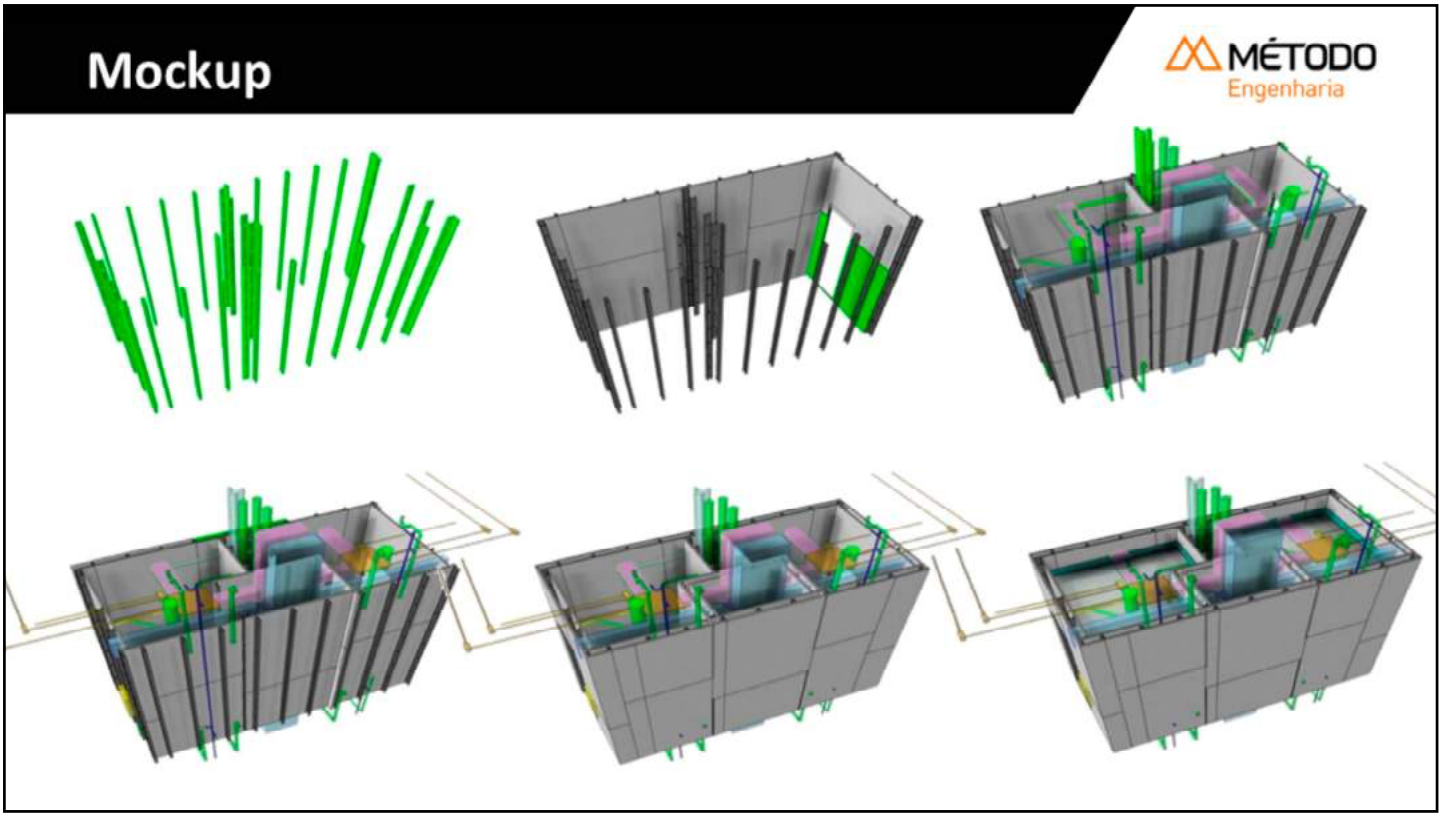


In this example, we designed a pilot project to evaluate the laser scanner technology.

In this building, there are a lot of repeated bathrooms and we used pre assembled kits of piping and plumbing systems.

First, we developed a detailed bathroom project including the drywall and the MEP systems to solve all the issues we could find in the interface of the disciplines.

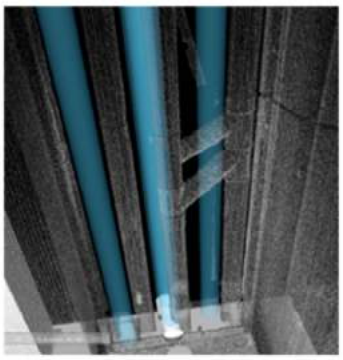
Then, we pre-assembled the kits on the field before the installation.

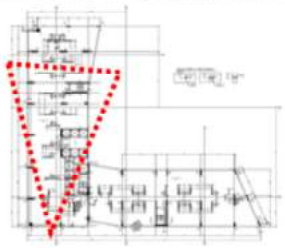
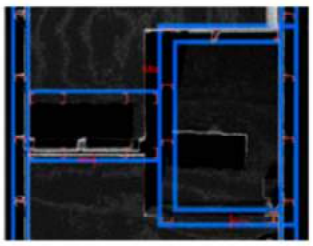


We also used the model to decide on the best installation logical sequence...

Pilot Project - Laser Scanner

MÉTODO Engenharia



We also introduced the use of total stations to verify the final quality of the execution.

In this pilot project we found deviations in the Drywall placement. And we used this images to inform the production team of the problems so that mistakes were not made in subsequent installations.

In Brazil, the use of laser scanners is quite expensive... But we believe it will soon become more affordable.

Benefits

- Boost the final level of quality
- Increase productivity at work
- Provide quality control on the site
- Improve the employment of Labor force throughout the process

The benefits we are looking for while testing the use of this technology are:

- Boosting the final quality standards – providing a higher degree of efficiency
- Increasing productivity at work – building in a controlled environment can increase productivity because issues can be handled more efficiently, successfully and faster.
- Controlling quality on the site – Because parts are ready to be assembled, there is also no waste of materials, and there is a safer environment for the workers.
- Improving the use of labor force throughout the process – Employ the best workers at the right time in the right places

Conclusion

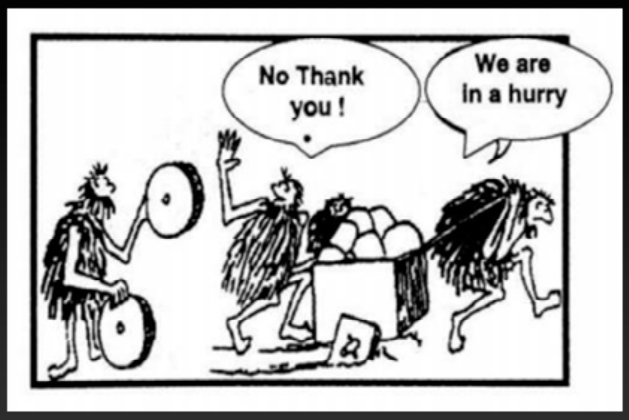
Conclusion

MÉTODO Engenharia

BIM ...

- Is not simply software - It is a new process!
- Requires involvement of the entire Construction Industry Community
- Needs continuous training and monitoring of its uses
- Provides great return on investment

- BIM is not simply software - It is a new process! – It goes beyond a 3D model design tool or database managing software.
- It's part of the design development process and a new construction management philosophy.
- It requires involvement of the entire Construction Industry Community – In order to achieve better results within the industry ... We need the involvement of designers, consultants, owners, and the supply chain people.
- It needs continuous training and monitoring of its uses. It is not sufficient to train professionals on tools. As a new technology, the BIM process is undergoing constant changes and is under continuous development. Therefore, companies should support sustained research and innovation.
- It provides great return on investment – For each step of implementation acomplished, as we tried to demonstrate during this presentation, the benefits are outstanding.



People often feel uneasy/insecure/uncomfortable when offered something new or different than the usual... However, it may be exactly what they need....

Thank you!

Joyce Delatorre, PMP – Head BIM
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MÉTODO Engenharia

Out/2015