



HR COMPACTA

FreeCAD Architecture BIM course

Knowing the universe of Free
Software

WHO AM I



Faculty of Technology of São Paulo Technologist in
Management Processes, Business Management

CPET - Professionalization and Technical Education Center
Building Technician

IBRESP
Real Estate Transaction Technician

FORTEC - São Vicente Course
Logistics Technician

Colégio Morumbi Sul EM
Computer Technician



WHO AM I



BIM Specialization

ENAPE - Ministry of Economy

Financial Planning and Analysis

SEBRAE

System Development

SENAC/Microsoft Innovation Center

Entrepreneurship, Business and Startups in Practice

Fast MBA - Udemey

Project Scope Management

FGV Online



HOW TO REACH THE OPEN SOURCE WORLD

Open source software is computer software with its source code made available and licensed under an open source license in which the copyright provides the right to study, modify and distribute the software free of charge to anyone and for any purpose.

- Financial weight of proprietary software;
- Sense of community;
- Risk of illegality;
- Greater mastery of your data;
- Compatibility and Interoperability;
- Accessibility;



FREE SOFTWARE x CLOSED SOFTWARE



SENSE OF COMMUNITY

It is the idea that one is not alone in the world, on the contrary: it is the certainty that it is necessary to think about the interests of society as a whole, and not just one's own.

- Collaboration;
- Feeling of Participation;
- Open World Network;
- Knowledge and Integration;
- Community Credibility;



FREE SOFTWARE vs PROPRIETARY SOFTWARE



BRL 31,450.00
or 12x 2,620.00



BRL 00.00



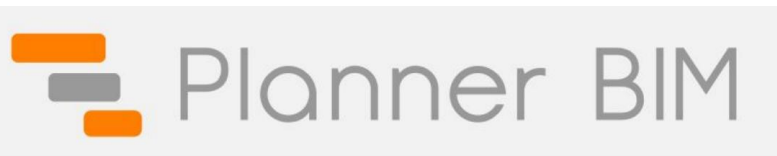
UNDERSTANDING OPEN BIM

A simple definition of openBIM is that it is a way for multidisciplinary teams that are not running the same software to exchange information. Through a set of shared standards and working procedures, openBIM improves data flow and enables interoperability between teams, tools and processes at all stages of construction. In this way, we understand that OpenBIM is not software, but a way of working.

buildingSMART , the not-for-profit consortium, of **which** Autodesk is a founding member, coordinates, endorses and maintains most of the activity around openBIM to promote industry-wide adoption. For the organization, “openBIM helps connect people, processes and data to achieve asset delivery, operation and maintenance goals”, throughout the entire lifecycle of an asset.



OPEN BIM FREE UNIVERSE



BLENDER**BIM**
ADD-ON



BIMvision®



IFC.js



OpenDroneMap

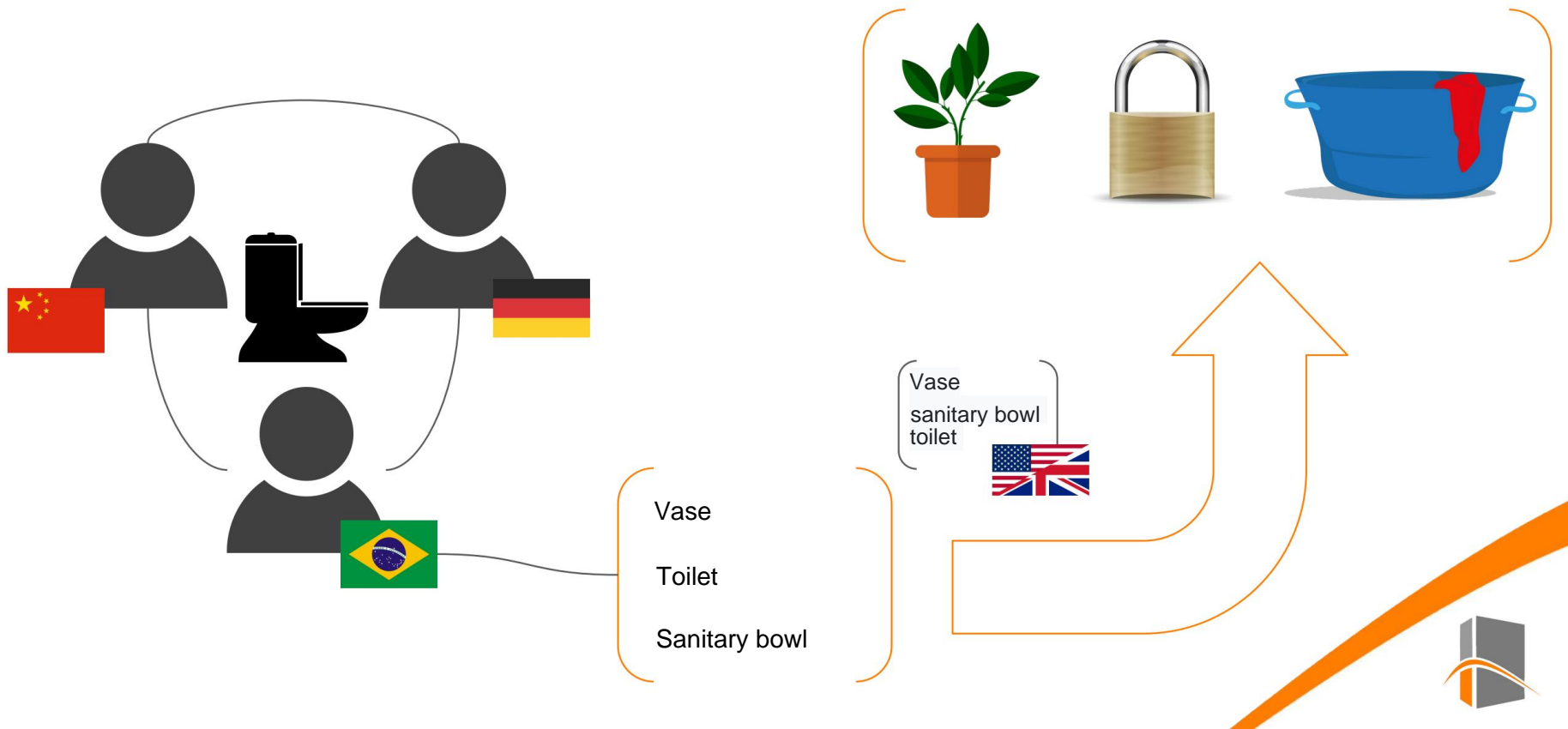


BENEFITS OF OPEN BIM

- Interoperability is the key to digital transformation in the asset industry built;
- Open and neutral standards must be developed to facilitate interoperability;
- Reliable data exchanges rely on independent quality benchmarks;
- Collaboration workflows are enhanced by open data formats and agile;
- Flexibility in technology choice creates more value for all stakeholders;
- Sustainability is protected by long-term interoperable data standards.



INTEROPERABILITY



INTEROPERABILITY



 **OMNICLASS™**
A Strategy for Classifying the Built Environment

{ 23-31 19 00 }





FreeCAD

Open Source parametric 3D CAD modeler



ORIGIN OF FREECAD

- Started as a project by the German Jürgen Riegel in 2001 as a GOM (Graphical Object Modeler) within the project of a company called OpenCASCADE; 2002 registered the software brand outside the initial company.
- Werner Meyer, one of the QSpec project managers, moved to a company called Imetric. The contact with Imetric turned out to be very promising as they were looking for a new 3D software platform for their 3D sensors. In 2005, Imetric donated most of their Mesh Module to FreeCAD and the Open Source community, and since then they have used FreeCAD as the basis for their sensor system software.
- Yorik van Havre joined the project in 2008 and started working on the Draft Module. Prior to this point, there was no way to create 2D geometry through the GUI. This module was programmed entirely in Python and not in C++ (the main programming language used in FreeCAD). Draft's new workbench has proven the Python integration to be a success and can be used to extend or customize FreeCAD's capabilities. In addition to his work on the Draft module, Yorik worked on expanding the FreeCAD documentation and became FreeCAD's "art director".

<https://wiki.freecad.org/Contributors>

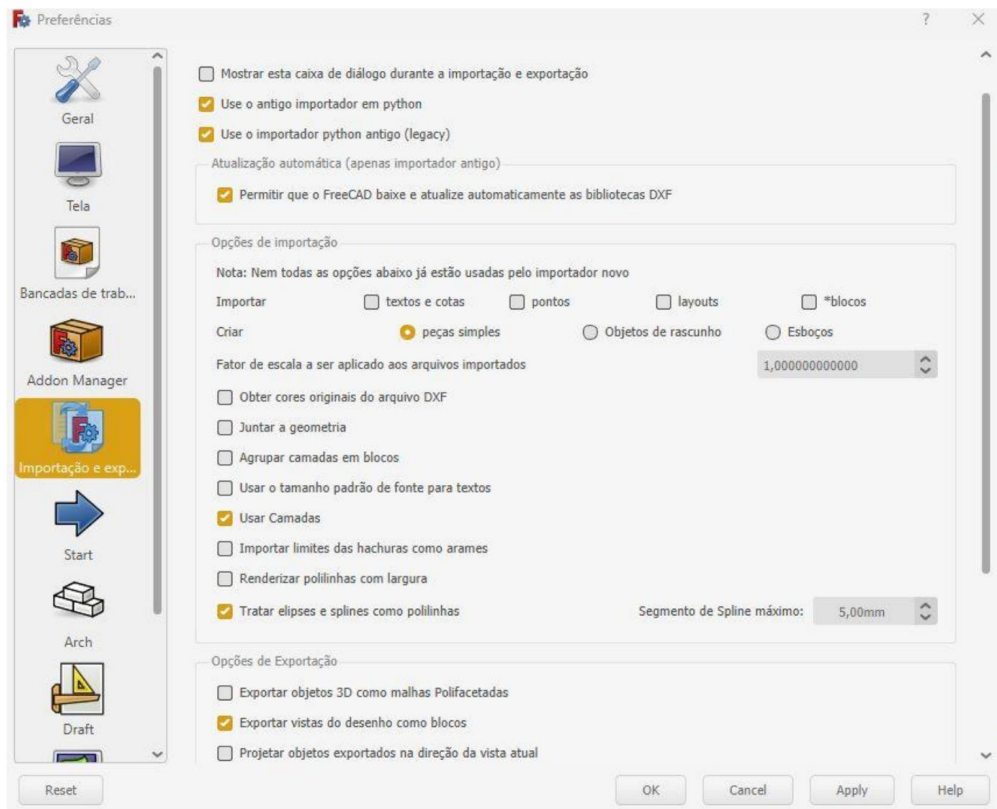


WHAT IS FREECAD

- FreeCAD is a general application free and open source (under the **LGPLv2+ License**) cross-platform (Windows, Linux and MacOS) 3D parametric CAD modeller. FreeCAD is directly aimed at use in mechanical engineering and product design, but it also applies to a wide variety of uses in other branches of engineering, such as architecture or other specialties;
- FreeCAD reads and writes several open file formats such as STEP, IGES, STL, SVG, OBJ, **IFC**, DAE and some proprietary formats like **DXF and DWG**;
- Creation of part with Finite Element Method;
- FreeCAD allows you to use the Python programming language for programmed creation of several elements, without the need to use the graphical user interface. In addition, several FreeCAD workbenches and tools are programmed in Python.



DXF AND DWG FILES



LibreDWG





FREECAD IN CIVIL CONSTRUCTION



WORKBENCH BIM



**WORKBENCH
TECHDRAW**



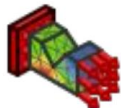
WORKBENCH Spreadsheet



WORKBENCH Draft *



WORKBENCH TRAILS



WORKBENCH FEM (In the process of being updated)



WORKBENCH Planner BIM (Beta Version)



WORKBENCH BIM

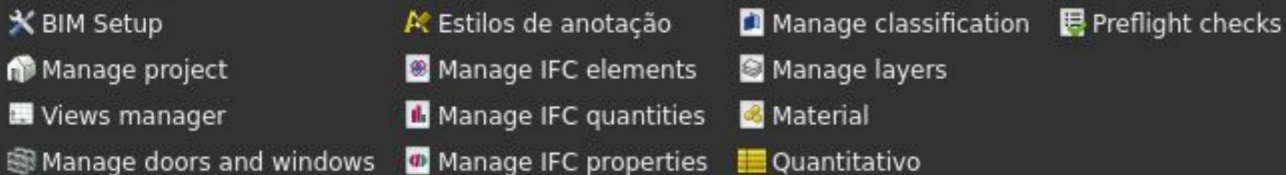
3d/tools



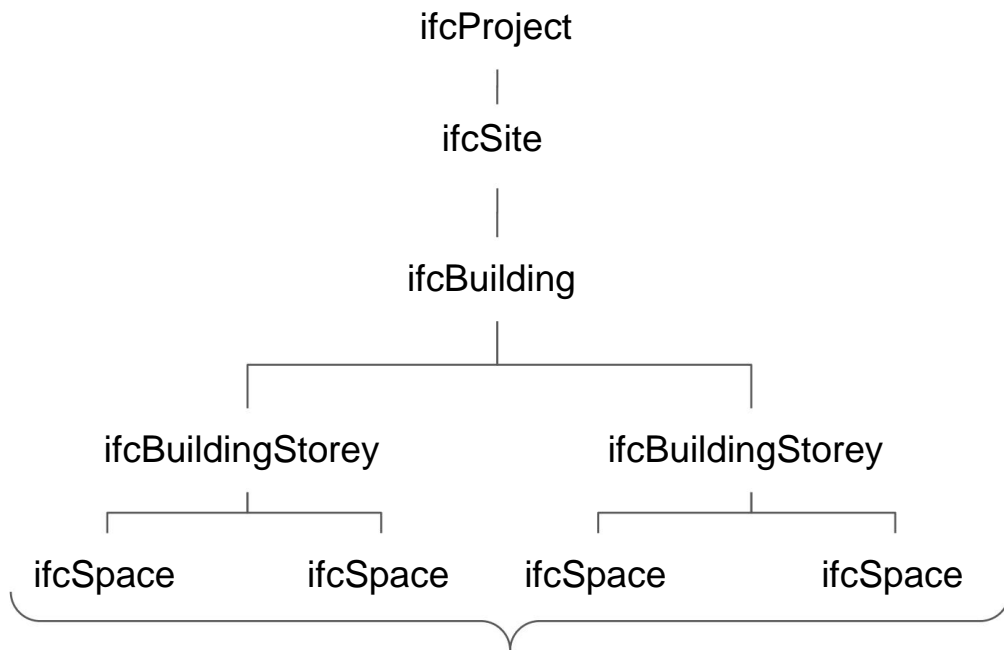
Annotation tools



Manage tools



BIM / IFC SCHEME IN FREECAD



ELEMENTS
(ifcWall - ifcDoor - ifcBeam - ifcColumnn)



FREECAD HAS APPROVAL


[Casa](#)
[Padrões ▾](#)
[Serviços ▾](#)
[Recursos ▾](#)

desenvolvedores do mercado local e internacional fornecendo soluções para arquitetos, engenheiros, empreiteiros, proprietários e muito mais.

Alguns dos fornecedores/desenvolvedores da lista são membros do buildingSMART International ou de um de seus capítulos e alguns deles se esforçaram para ter seus aplicativos certificados pelo buildingSMART para suportar o IFC. ***O software que foi certificado ou está em processo de certificação pode ser encontrado aqui:*** <https://technical.buildingsmart.org/services/certification/ifc-certification-participants/>. No entanto, todas as entradas da lista abaixo estão aproveitando as especificações abertas e internacionais para abastecer o mercado global de uma forma ou de outra.

Base de dados de implementação de padrões internacionais buildingSMART

Esta é uma lista de todos os produtos de software que alegam oferecer suporte aos padrões buildingSMART International, incluindo IFC, BCF e bSDD.

Embora os melhores esforços sejam feitos para manter esta lista atualizada, sinta-se à vontade para nos contatar em technical@buildingSMART.org se você perceber que um produto está faltando nesta lista ou as informações fornecidas precisam ser atualizadas.

mostrar entradas

Procurar:

Fornecedor/Desenvolvedor	produtos	Categoria	Subcategoria	IFC2x3	IFC4	IFC 4.3	BCF XML	API BCF	API bSDD
*código aberto (GNU LGPL2+ e CC-BY-3.0)	FreeCAD	Criação de modelos	Em geral	X	X		X		

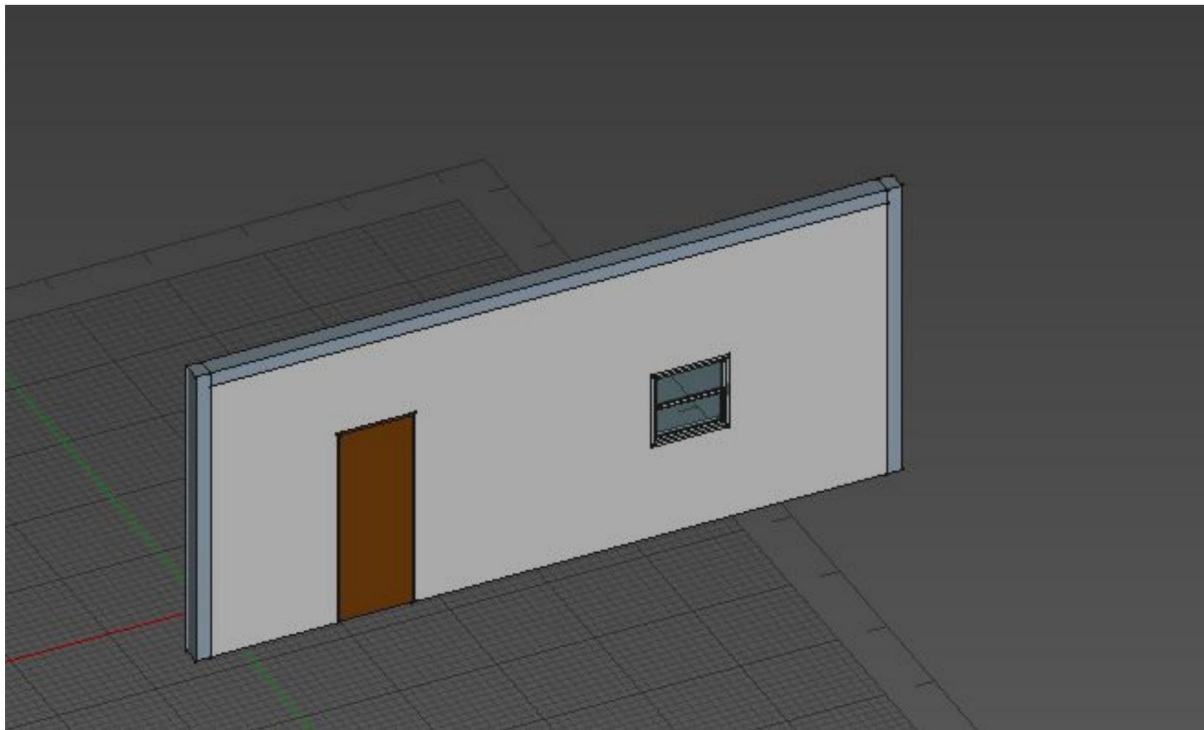
Mostrando 1 para 1 de 1 entradas (filtradas de 389 entradas totais)

[Anterior](#) [Próximo](#) >

A tabela buildingSMART International Standards Implementation Database foi modificada pela última vez em 2022-08-01 14:37:02 por Jeffrey Ouellette.



IFC ATTRIBUTES IN FREECAD



IFC ATTRIBUTES IN FREECAD

IFC	
Ifc Type	Wall
IFC Attributes	
Description	Parede de Vedação
Global Id	
Object Type	Wall
Predefined Type	SOLIDWALL
Tag	IFCWall

IFC	
Ifc Type	Window
IFC Attributes	
Description	Janela de Alumínio
Global Id	
Object Type	Window
Overall Height	0,80 m (.Height.Value)
Overall Width	0,80 m (.Width.Value)
Partitioning Type	SINGLE_PANEL
Predefined Type	WINDOW
Tag	ifcWindow
User Defined Partitioning Type	Janela da Fachada

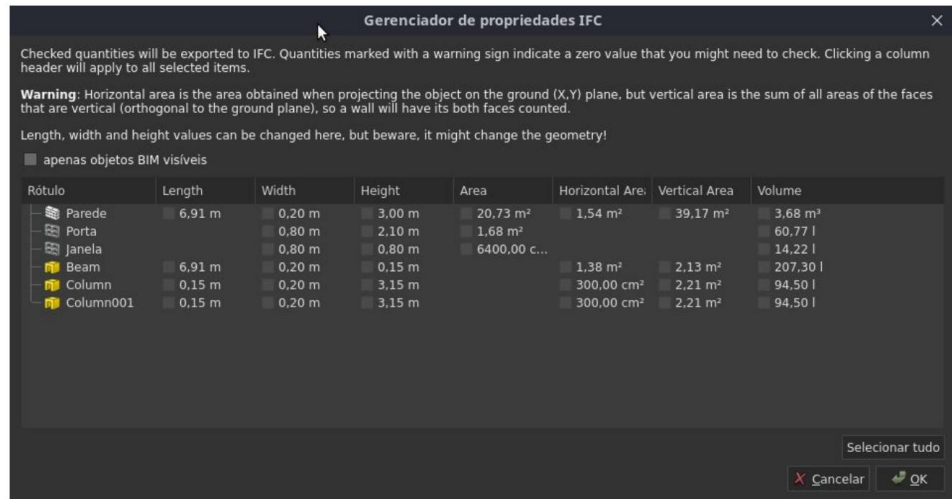
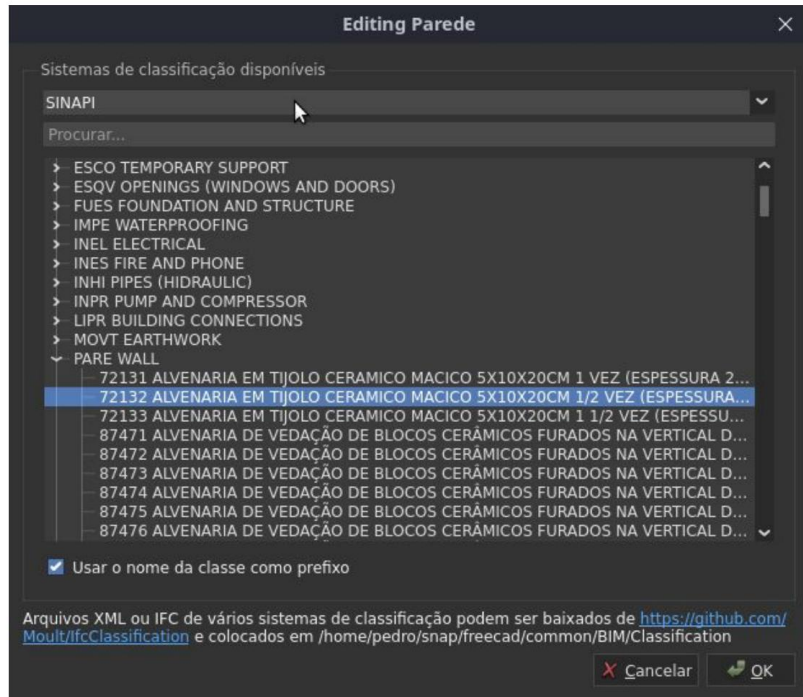
IFC	
Ifc Type	Beam
IFC Attributes	
Description	Viga 15x20
Global Id	
Object Type	Beam
Predefined Type	BEAM
Tag	ifcBeam

IFC	
Ifc Type	Door
IFC Attributes	
Description	Porta de Madeira
Global Id	
Object Type	Door
Operation Type	SINGLE_SWING_LEFT
Overall Height	2,10 m (.Height.Value)
Overall Width	0,80 m (.Width.Value)
Predefined Type	DOOR
Tag	ifcDoor
User Defined Operation Type	Porta de Entrada

IFC	
Ifc Type	Column
IFC Attributes	
Description	Pilar 15x20
Global Id	
Object Type	Pilaster
Predefined Type	PILASTER
Tag	ifcColumn



IFC ATTRIBUTES IN FREECAD

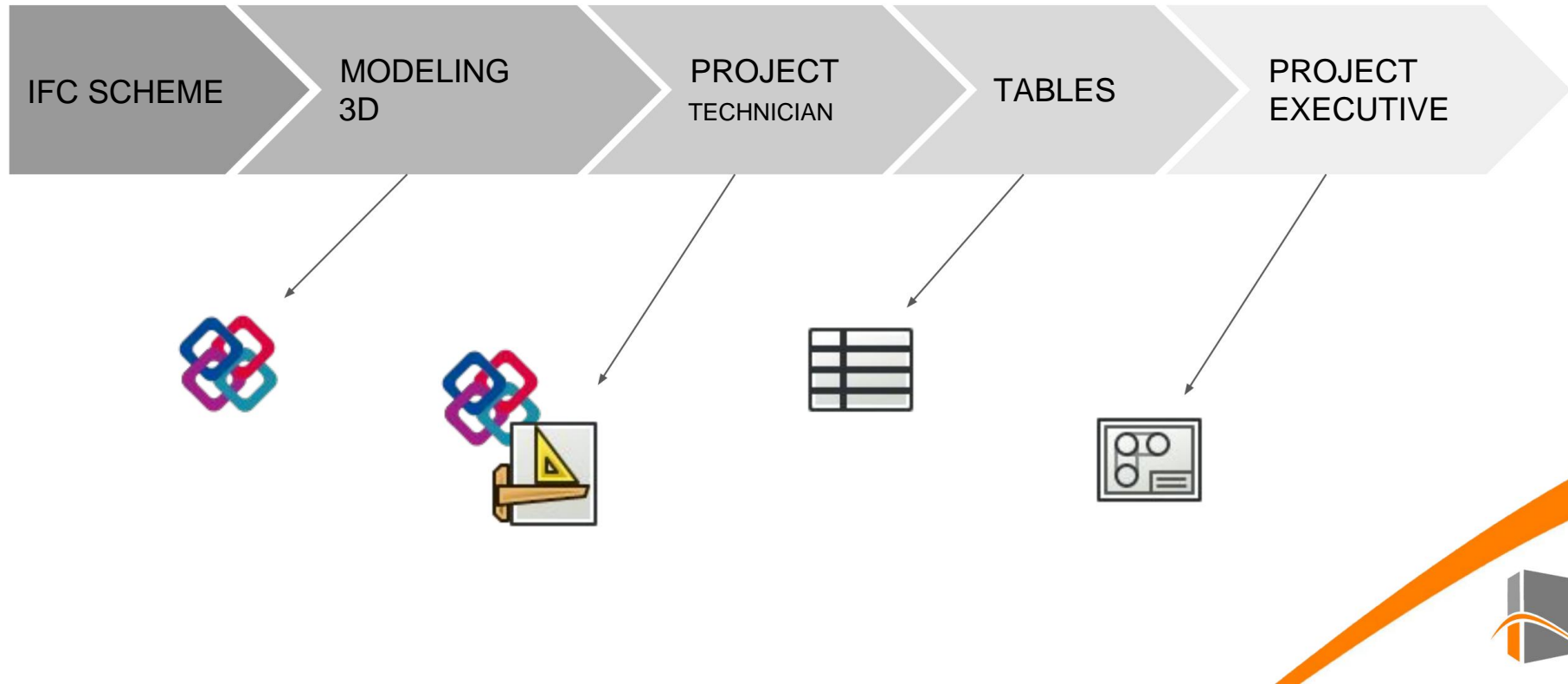



```
#22=IFCGEOMETRICREPRESENTATIONSUBCONTEXT('Body','Model',*,*,*,*,#21,$,.MODEL_VIEW.,$);
#23=IFCPROJECT('2l1BmLqr98px6_ho5Kxntv',#5,'Projeto_Teste','',',',',',',Project',',( #21),#19);
#24=IFCSITE('1IhVEZSvn7u0SwfVoZ5KY2',#5,'Terreno','',',',',',',Site',.COMPLEX.,(0,0,0),(0,0,0),0.,$,,$);
#25=IFCBUILDING('34P7Cf6_jEqU0Rvp3RWGrK',#5,'Casa_Terrea','',',',',',',Building',.COMPLEX.,$,,$);
#26=IFCBUILDINGSTOREY('0ovXuzlt12Ie30ht45MYox',#5,'Pavimento_00','',',',',',',Floor',.COMPLEX.,$);
#27=IFCDIRECTION((1.,6.62890907611056E-17));
#28=IFCCARTESIANPOINT((0.,1.13686837721616E-13));
#29=IFCAXIS2PLACEMENT2D(#28.#27);

#7=IFCRODDIRECTORINFORMATION($,$,#70,#71),
#49=IFCWALL('2pak2Gokn1vOCXldmSkzbQ',#5,'Parede','Parede de Veda\X2\00E700E3\X0\o','Wall',#39,#48,'IFcWall',.SOLIDWALL.);
#50=IFCCARTESIANPOINT((1.7709270470909112515050702896E-142516)).
```



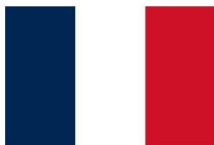
WORKFLOW IN FREECAD



FREE SOFTWARE IN PUBLIC BODIES



- In 2000, the government demonstrated strong public support for free software;
- In May 2003, in Munich, it was announced its plans to migrate 14,000 public administration computers to Linux and other free software through an agreement with IBM and SuSe. Despite Microsoft making an offer with a lower cost than estimated for the migration, it was decided to deploy free software instead of proprietary software;
- In 2009, the German government invested €500 million for the "Open Source and Green IT" program.



- French agency for Administration and Development has since 2001 promoted the use of Linux and open standards in public administration; • In 2002, the public hospital network in Paris migrated its system to Linux in an attempt to reduce costs of maintenance and as an instrument to homogenize its systems;
- Nicolas Sarkozy recommended that the France to increase the use of free software and argued that tax incentives should be considered as a way to encourage development of the sector. In 2008 the market for free software in France grew by around 80%.



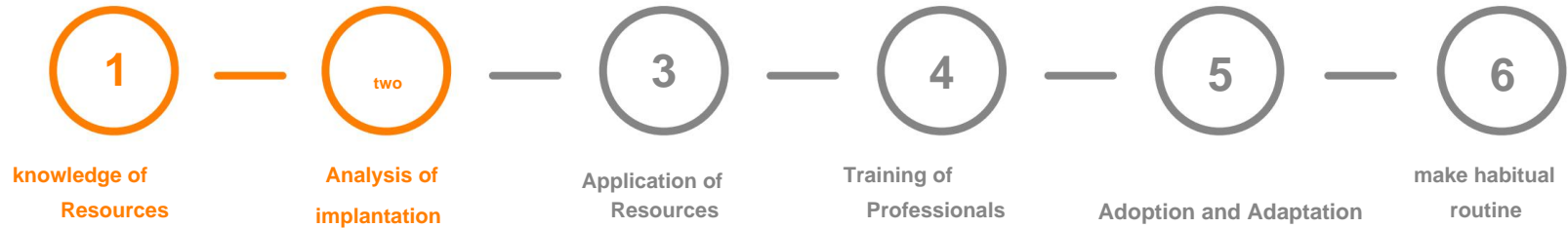
- With the economic crisis that started in 2009, public administration, companies, universities and users in Spain are turning to free software. Spain is among the most active countries in the European Union in terms of free software adoption; In 2006, the Spanish Parliament unanimously passed a resolution "obligating" the government to actively promote the use of free software in public administration.



FREE SOFTWARE IMPLEMENTATION



PROPER IMPLEMENTATION METHOD



FINAL CONSIDERATIONS

BIM IS NOT A TOOL IT'S A METHOD

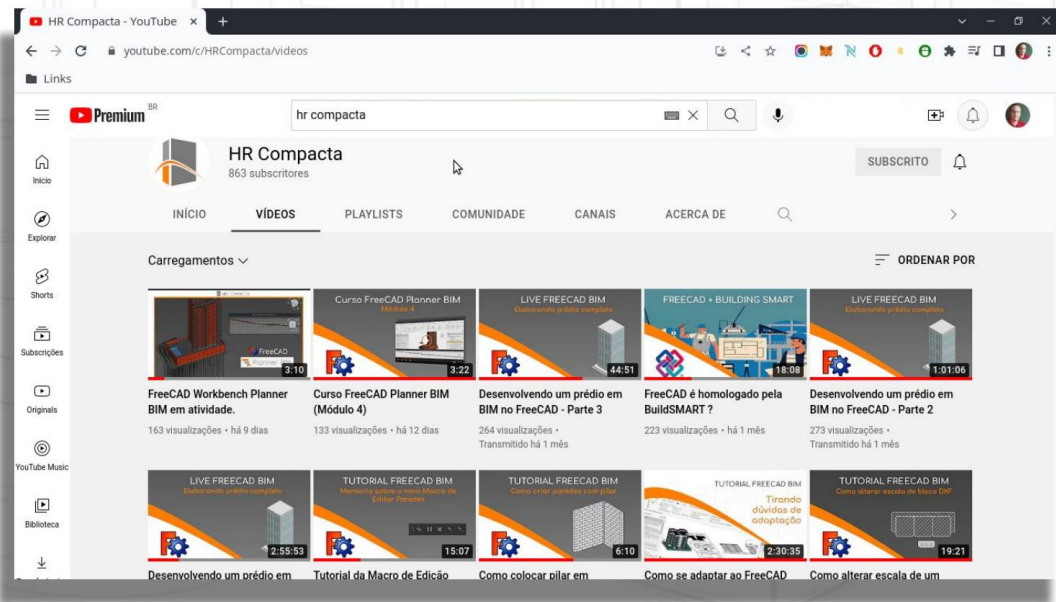
NOT EVERYTHING THAT IS 3D IS BIM, BUT IF IT IS BIM IT WILL BE 3D

FREECAD IS AN OBJECTIVE AND BRUDE PLATFORM THAT DOES WELL
SPECIFIED IS WORTH MUCH MORE THAN YOU IMAGINE





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FreeCAD Architecture BIM course

Levels of Development
(LOD)

INTRODUCTION TO LOD

The LOD (Level of Development) is a scale that defines the level of detail and completeness of a BIM (Building Information Modeling) model of a construction project.



WHY LOD IS IMPORTANT

LOD is important because it helps to clearly define the level of detail and completeness of the BIM model. This allows construction professionals to understand what is included in the model and what is not, and to make informed decisions about subsequent project phases.



HOW IS LOD CLASSIFIED?

The LOD is classified into levels ranging from 100 to 500, each level representing an increasing amount of information about the project. LOD 100 represents the model at an early stage of development, while LOD 500 represents the final, detailed and complete model.



WHAT IS INCLUDED

At each LOD level, there is an increasing amount of information included in the BIM model. For example, LOD 100 includes basic building shapes and dimensions, while LOD 500 includes detailed information about materials, systems, and other characteristics relevant to the building.



HOW IS IT APPLIED IN THE CONSTRUCTION PROCESS?

LOD is used throughout the project lifecycle to ensure that the BIM model is always up to date and reflects the current state of the project.

This allows teams to work more efficiently and collaboratively, and ensures model quality and consistency.



LOD BENEFITS

Some of the benefits of using LOD include improving collaboration between teams involved in construction, reducing errors and rework, increasing the efficiency of the construction process, and increasing the quality of the final design.



THE FUTURE OF LOD

As BIM technology advances, the use of LOD is expected to continue to evolve and become increasingly important in construction. We are likely to see the implementation of new levels of LOD and the integration of even more advanced technologies into the build process.



IN SUMMARY

LOD is a crucial scale in BIM technology, helping to define the level of detail and completeness of the model and ensuring efficient collaboration between teams involved in construction. As technology advances, the use of LOD is expected to continue to evolve and play an increasingly important role in building quality designs.



LOD TABLE

LOD 100	This level represents a simplified representation of objects, usually as blocks or generic shapes. Information included at this level includes the location, size, and orientation of objects.
LOD 200	This level adds more detail to objects, including information about their specific shapes and dimensions. The information included at this level is sufficient to enable feasibility studies to be carried out and to assist in making important design decisions.
LOD 300	This level adds even more detail to objects, including information about their materials and building systems. The information included at this level is sufficient to perform engineering analyzes and to assist in making project design decisions.
LOD 350	This level adds information about the objects' constructive details, including information about their installation systems and material specifications.
LOD 400	This level adds information about object finishes, including information about coatings, colors, and textures.
LOD 500	This level represents the most detailed level of information, including information about all aspects of the objects, including their construction details, finishes, installation systems and material specifications. The information included in this level is sufficient for carrying out an As Built project





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Interoperability

INTRODUCTION

- What is interoperability and why is it important in technology Modern?
- Interoperability is the ability for disparate systems to work together without disruption or failure. It is a crucial issue for systems integration, as it allows information to be shared easily between different applications and platforms.



ADVANTAGES OF INTEROPERABILITY

- Increased efficiency and speed in exchanging information
- Greater flexibility for users as they don't have to rely on from just one system or platform
- Cost reduction, as it is possible to make the most of the software investment and avoid data loss or inefficiencies resulting from incompatible systems



HOW INTEROPERABILITY IS ACHIEVED

- Open standards: Adopting open standards is one of the main ways to achieve interoperability. This allows different systems to communicate using a common language.
- API Integration: API integration allows systems to different people to connect and share information easily and efficiently.
- Compliance with standards: Aligning with international standards is another important way to ensure interoperability, as this allows disparate systems to work together without disruption or failure.



APPLICATION OF INTEROPERABILITY

- Interoperability in healthcare: Interoperability is critical in healthcare as it allows healthcare professionals to share information confidentially and efficiently.
- Interoperability in Logistics: Interoperability allows logistics companies to efficiently share delivery, tracking, and inventory information.
- Financial Interoperability: Interoperability is critical in the financial industry as it allows institutions to share account information, transfers and payments securely and efficiently.



APPLICATION OF INTEROPERABILITY

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CONCLUSION OF INTEROPERABILITY

Software interoperability is the ability for two or more software systems to work together without interruption or failure. This means that data and information can be shared between different systems without the need for reformatting or manual translation.



WHO IS RESPONSIBLE FOR INTEROPERABILITY?

In this case, the BIM Manager is a specialist in BIM processes and tools and is involved in all phases of construction, but his participation is particularly active in the initial stages of project design and planning.



PEB x BIM MANDATE

The BIM Execution Plan and the BIM Mandate are important documents that define how BIM technology will be used in a project or in an organization. Although they have similarities, there are some important differences between them:



BIM EXECUTION PLAN

BIM Execution Plan (BEP): It is a detailed document that describes how the BIM technology will be used in a specific project. It defines the expectations, responsibilities, and processes that will be followed during the planning, design, construction, and maintenance phase of a project. The BEP also includes information about software usage, levels of detail (LOD), and collaboration expectations between the teams involved.



BIM MANDATE

BIM Mandate (BIM Manual): It is a document that describes the policy for the use of BIM technology in an organization. It defines the expectations, responsibilities and processes that will be followed in all projects in the organization. The BIM Mandate can also include guidelines on staff training and education, use of standards and norms, and systems integration.



IN SUMMARY

The BIM Execution Plan is designed to be used on a specific project, while the BIM Mandate is intended to be used as a general guideline for all projects in the organization. Both tools are important to ensure efficiency, effectiveness and quality in the implementation of BIM technology.





HR COMPACTA

FreeCAD Architecture BIM course

NBR - 15965

I UNDERSTAND THE IMPORTANCE

NBR-15965 offers a series of benefits for construction professionals and for the sector in general. This standard brings a standardized approach to the representation of information in BIM models, making them clearer and more understandable for everyone involved in the project.



I UNDERSTAND THE IMPORTANCE

NBR-15965 presents a codified set of information, which is understood not only by human beings, but also by computer software. In this way, it is possible to ensure more efficient communication between all interested parties, reducing the risk of errors and misunderstandings.



I UNDERSTAND THE IMPORTANCE

In addition, the standard is organized and divided into 15 tables of contents, which bring a clear and objective classification of the information represented in the BIM model. In this way, it is possible to ensure that all information is represented in a consistent and standardized manner, making it easier to understand and use this data.



I UNDERSTAND THE IMPORTANCE

In summary, NBR-15965 is a fundamental standard to ensure efficiency, effectiveness and quality in the implementation of BIM technology, promoting clearer and more standardized communication between all parties involved in the project.



"PERIODIC" TABLE OF BIM BR CLASSIFICATION

3E

ELEMENTS
table 21

2C

PRODUCTS
table 23

3R

RESULT
table 22

1F

RESULT
table 31

1S

RESULT
table 32

1D

RESULT
table 33

4U

RESULT
table 11

4V

RESULT
table 12

2N

RESULT
table 34

4A

RESULT
table 13

4B

RESULT
table 14

0P

RESULT
table 49

0M

RESULT
table 41

5I

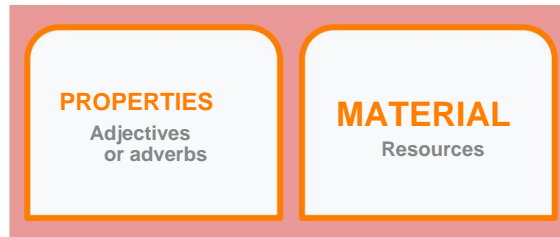
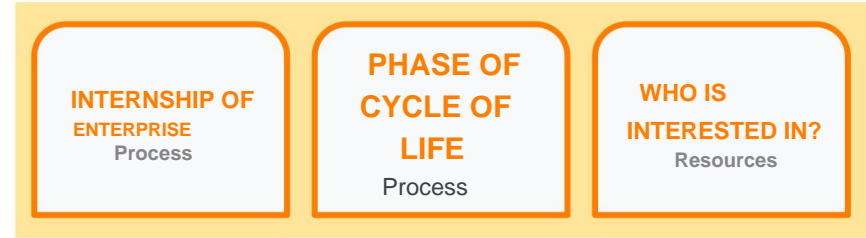
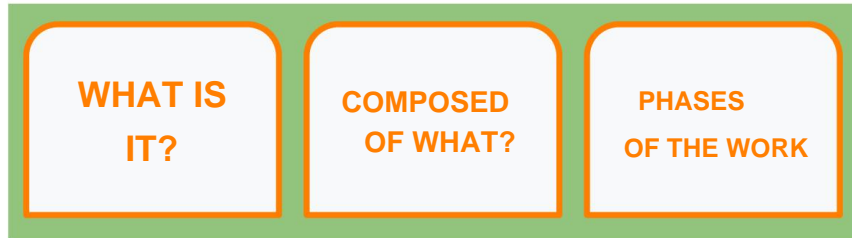
RESULT
table 36

2Q

RESULT
table 35



"PERIODIC" TABLE OF BIM BR CLASSIFICATION



ENTITIES BUILT BY FUNCTION

4U

RESULT
table 11

A constructed entity is made up of interrelated spaces and elements and is defined by its primary function, which may change over its lifetime. Function is the purpose of use of a constructed entity and can determine its form.



ENTITIES BUILT BY FORM

4U 4V

RESULT table
11 table 12

Built entities are complete units of the built environment, composed of spaces and interrelated elements characterized by their purpose of use, known as function. They can be viewed separately without being part of another larger unit.

For example, a high-rise building can be used for several purposes, such as residences, commercial offices, among others.



ENTITIES CONSTRUCTED BY FUNCTION AND FORM

4U

RESULT
table 11

4V

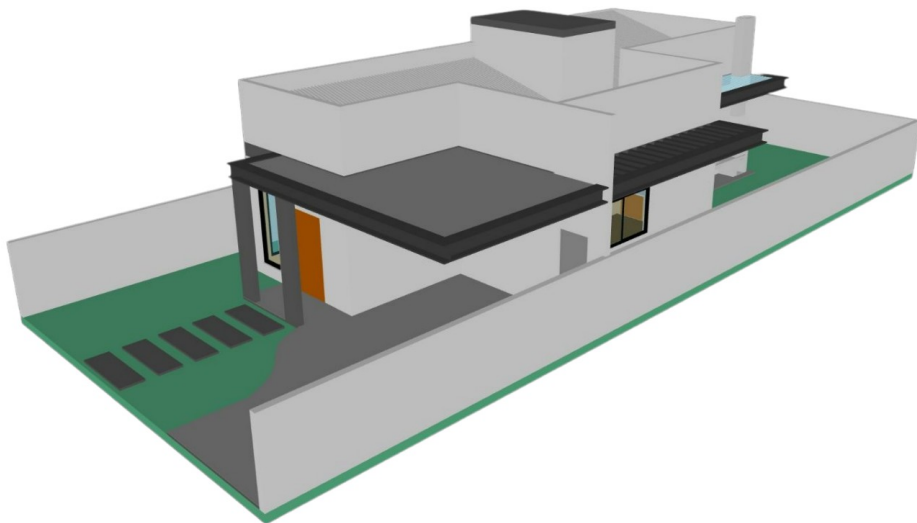
RESULT
table 12

The classification of a building or facility is based on its environment and encompasses the complete structure. Project planning considers factors such as feasibility studies and mapping areas to determine the scope of the project and its relationship with the surroundings.



WHAT IS THAT ?





DADOS DO PROJETO – NBR 15965	
Código de USO	4U 16 11 00
	<input checked="" type="radio"/> Comercial <input type="radio"/> Residencial
Código de FORMA	4U 18 11 14 15
Status do Projeto	<input checked="" type="radio"/> Desenvolvimento <input type="radio"/> Concluído
Observações	
4U 16 00 00	Edifícios Habitacionais
4U 18 00 00	Edifícios
4U 18 11 14 11	Edifício Isolado de Baixa Altura com Cobertura de Telhas
<input type="button" value="Enter my information"/>	





DADOS DO PROJETO – NBR 15965	
Código de USO	4U 12 21 31
	<input checked="" type="radio"/> Comercial <input type="radio"/> Residencial
Código de FORMA	4U 18 11 14 15
Status do Projeto	<input checked="" type="radio"/> Desenvolvimento <input type="radio"/> Concluído
Observações	
4U 12 00 00	Edifícios Educacionais
4U 12 21 31	Ensino Médio
4U 18 00 00	Edifícios
4U 18 11 14 15	Edifício Isolado de Baixa Altura com Cobertura de Laje
<input type="button" value="Enter my information"/>	



SPACES BY FUNCTION

4U 4A

RESULT table
11 table 13

Spaces (or environments) for function are the basic units of the built environment, which are delimited by physical or abstract boundaries and characterized by their main function. They have a primary purpose of use and can be occupied by people, objects or substances, and serve as a means for carrying out activities or movements.

While there may be a correlation between form and function, most environments can accommodate different functions throughout their lifecycle. The table does not address the shapes of the environments, but their main function.



SPACES BY FORM

Basic units of the built environment, which are delimited by physical or abstract boundaries and characterized by their physical form.

4U 4B 4A

RESULT table 11

table 14 table 13

- Spaces or environments are distinct from each other and from elements present in the built environment, and are usually part of a larger and more relevant built entity.
- The borders that separate environments can have three-dimensional dimensions, as is the case of a room, or two-dimensional dimensions, such as a public sidewalk.



CONSTRUCTION ELEMENTS

A building element is made up of components or an assembly that together play a major role in the building. These functions may include structuring, fencing, servicing facilities or buildings, or even a process such as land clearing. The main elements can also be composed of several sub-elements, as is the case of the roof of a building, which is composed of the structure, the external enclosure and the roof.

4U 3E 4A

RESULT ELEMENTS table 11

table 21 table 13

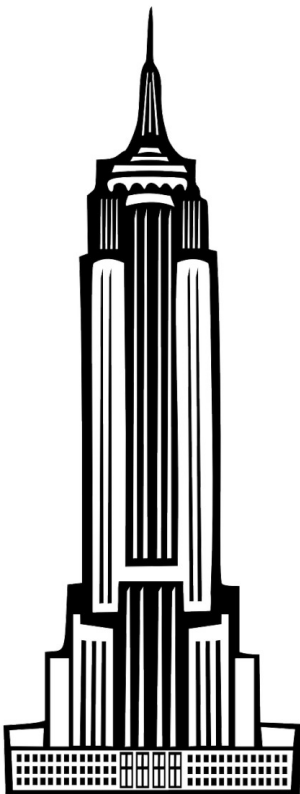


**WHAT
MATERIAL?**

WHAT KIND?

**WILL YOU
HAVE WINDOWS?**





DADOS DO PROJETO – NBR 15965	
Código ELEMENTO	3E 41 51 11 11
	<input checked="" type="radio"/> Comercial <input type="radio"/> Residencial
Status do Projeto	<input checked="" type="radio"/> Desenvolvimento <input type="radio"/> Concluído
Observações	
2C 41 51 11	Aberturas verticais
2C 41 51 11 11	Aberturas transparentes
<input type="button" value="Enter my information"/>	



CONSTRUCTION ELEMENTS

interiors	3E.03.00.00
Internal Constructions	3E.03.10.00
Internal Partition	3E.03.10.10
Mobile Partitions Internal	3E.03.10.10.50



CONSTRUCTION ELEMENTS

Construction site	3E.07.00.00
Land Preparation	3E.07.10.00
demolition of Work Elements	3E.07.10.20
Selective Demolition of <small>Constructions</small>	3E.07.10.20.50



RESULT OF WORK

Work results are the result of production phases or subsequent alteration, maintenance or demolition processes, and can be identified by one or more of the following characteristics:

4U 3R

RESULT table
11 table 22

- Specific skill (specialization) or specialized company involved;
- Specific constructive resources used;
- Part of the construction where the result is obtained;
- Temporary or preparatory work that works.



CONSTRUCTION RESULTS

Masonry	3R.04.00.00
Built Masonry	3R.04.20.00
brick masonry	3R.04.21.13



COMPONENTS / PRODUCTS

- Products are elements or assemblies intended for permanent incorporation into built structures.
- They are the fundamental parts used in construction.
- A product can be a single manufactured item, an industrialized assembly made up of several parts, or a stand-alone, mass-produced system. This table presents INDIVIDUAL products, sorted by number and designation in one place.

4U 2C 3R

PRODUCTS RESULT table

11 table 22 table 23



COMPONENTS / PRODUCTS



23-31 19 00



2C.78.18.14.00.00.00



WORK PHASES - LIFE CYCLE

The stages of a project's lifecycle are generally identified by two terms used in the construction industry: stage and phase.

1F 4U

RESULT table
11 table 31

- Stage: Refers to major segments or parts of a project, such as conception, selection of deliverables, design, construction documentation, contracting, execution, utilization and closure.
- Phase: Represents a piece of work, which is the result of planning and executing tasks according to a defined section of a stage.



WORK PHASES - LIFE CYCLE

Construction Phase	1F.40.10.00
Construction Startup Phase	1F.40.40.40.11
Mobilization Phase	1F.40.40.11.14



SERVICES

4U 1S 1F

RESULT table 11

table 31 table 32

Services include activities related to construction, design, maintenance, renovation, demolition, commissioning, decommissioning and other functions throughout the lifecycle of the constructed entity. These are actions that affect the building environment, including all activities undertaken by participants in the creation and sustainability of the built environment. Examples include design, tender, quote, construction, maintenance, and inspection.



SERVICES

Services of Implementation	1S.70.00.00
Construction	1S.70.35.00
concreting	1S.70.35.03



SUBJECTS

Disciplines are specializations of the actors involved in the lifecycle processes of a constructed entity.

- The table does not address individual team member roles.
- These roles are described by Table 34 – Organizational Roles. Together, tables 33 and 34 provide a complete classification such as "Electrical Installation Supervisor".

1D 4U 1S 1F

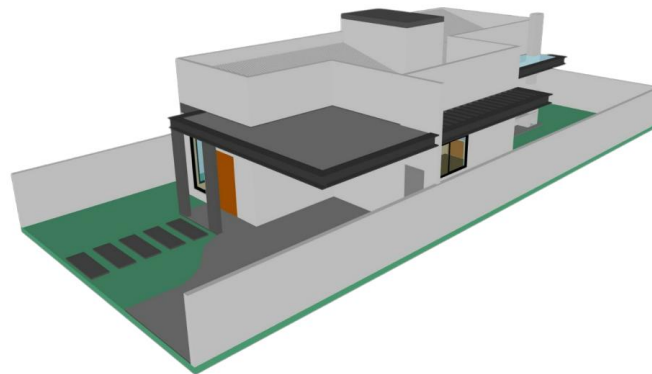
RESULT table 11 table 31

table 32 table 33



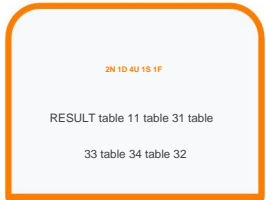
SUBJECTS

Projects	1D.21.00.00
Architecture	1D.21.11.00
Architecture Residential	1D.21.11.11



FUNCTIONS

Organizational Roles are the technical functions performed by individuals or groups who participate in the processes and procedures in the life cycle of a building. The table highlights the participant's scope of responsibility and their work function, without considering knowledge, education or training.



Some roles require specialization, but this is combined with Table 33 of Disciplines. A participant can be an individual, team, company, association, agency, institute or similar organization.

Examples: CEO, Supervisor, Architect, Owner, Intern.



FUNCTIONS

Functions of Development	2N.20.00.00
Project Functions	2N.20.11.00
Architect	2N.20.11.11



EQUIPMENT / TOOLS



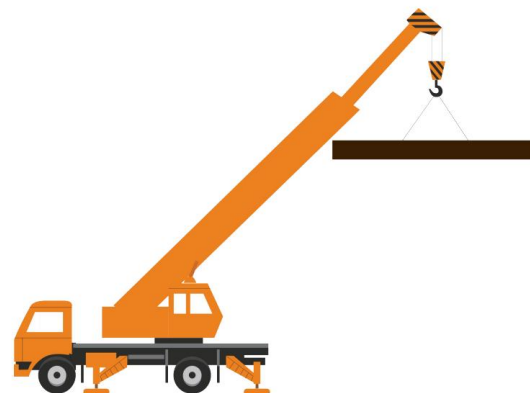
Equipment and Tools are resources used in design and construction that are not a permanent part of the structure. These include computers, vehicles, scaffolding, and other items needed to carry out the lifecycle activities of a constructed entity.

Examples: computers, software, siding, crane, drainage equipment, concrete forms, hammer, etc.



EQUIPMENT / TOOLS

Equipment of Construction	2Q.51.31.00
Lifting Equipment and Conveyors	2Q.51.31.33
Tower Cranes	2Q.51.31.33.36



INFORMATION

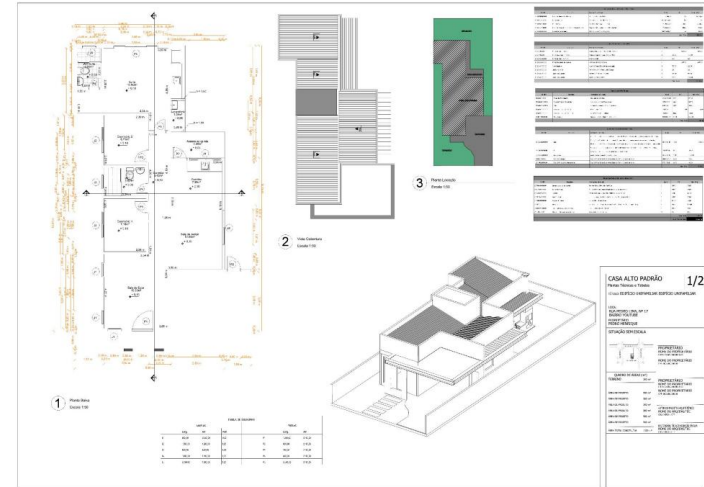


Information is data referenced and used during the process of creating and sustaining the built environment. They can exist in different standards, including digital or printed formats, and can be something very generic like a manufacturing standard or very specific like a design manual. Information is the main tool for communication during the process of creating and sustaining the built environment, and usually needs to be organized, stored and retrieved.



INFORMATION

files and views of Project	5I.71.91.13.11
Horizontal Views in 2D	5I.71.91.13.11.13
floor plans	5I.71.91.13.11.13.13



PROPERTIES



Properties are the distinguishing characteristics of buildings. They only have meaning within a specific context, when related to one or more constructions. The requirements, in turn, establish the necessary characteristics for a construction and are established from the definition of the appropriate properties. Several factors can affect the properties of constructions, from the moment of choice or design until after its completion.



PROPERTIES

Address	0P.10.10.13
street name	0P.10.10.13.02
number of Public place	0P.10.10.13.03

TÍTULO DA FOLHA		Nº FOLHA
Indicar os desenhos que a folha contém: levantamento planialtimétrico, implantação, ortos, plantas, etc. ()		(numerar em sequência)
Classificação do tipo de obra e atividade (verificar no decreto municipal 45.817/05)		
proprietário(s)	cat. de uso atividade (ver decreto mun. 45.817/05)	
local da obra (indicar endereço com número)	(bairro)	zona de uso/Ver ficha técnica)
contribuinte (ver no IPTU)		escala (indicar escalas utilizadas em plantas)
situação sem escala croqui sem escala da situação do lote em questão, indicando no mínimo a quadra, a orientação Norte/Sul e a distância até a esquina mais próxima)	Declaro que a aprovação do projeto não implica o reconhecimento por parte da prefeitura do direito de propriedade do terreno.	
áreas (m2) terreno E= R=	proprietário(s)	
quadro de áreas (verificar informações necessárias de acordo com o assunto pretendido)	autor do projeto CREA _____ CCM _____	
	responsável técnico CREA _____ CCM _____	



MATERIALS



Materials are the basic substances used in the construction or manufacture of items related to this area. These substances can be raw materials or industrialized compounds, regardless of their forms. For example, aluminum is a chemical compound that can be found in different formats, such as bars, sheets, blocks, among others. Even so, it is described as the material from which the product is made. In addition to aluminum, there are other materials such as metallic compounds, rocks, soil, wood, glass, plastics, and rubber.



MATERIALS

Lawn	0M.20.30.05.02
stone blocks	0M.20.10.10.01.00



GENERAL EXAMPLE

O caráter integrador do sistema de classificação ISO 12006-2 / ABNT 15965



Propriedades de tipo

Nome: Porta Simples de Abir

Tipo: Abertura - Marco de Madeira

Parâmetros de tipo

Parâmetro	Valor
Construção	E
Tipo de construção	3
Função	Interiores
Fechamento da parede	Por hospedeiro
Material e acabamento	
Marco Madeira	<input checked="" type="checkbox"/>
Adoção de Madeira	<input checked="" type="checkbox"/>
Adoção Metálica de Centro	<input type="checkbox"/>
Guarnição Retã	<input type="checkbox"/>
Guarnição Chamada	<input type="checkbox"/>
Cor	
Comprimento	2,1000
Altura bruta	2,1000
Altura	2,1000
Comprimento	2,1000
Espessura	
Especificações	
Classe ISO	07-01-12
Transmissão de luz visual	

OK Cancelar Aplicar

SIURB - EDIF

07-01-12

PM.12 - PORTA LISA COMUM/
ENCABEÇADA - 82X210CM

02013

CARPINTEIRO (SGSP)

02014

AJUDANTE DE CARPINTEIRO (SGSP)

30062

PORTA LISA 82 X 210 CM -

ENCABEÇADA -
COMPENSADA/SARRAFEADA

PADRÃO IMBUÍA E CEDRO P/ PINTURA
A ÓLEO/VERNIZ - E=35MM

31008

DOBRADIÇA 3.1/2" X 3" REFORÇADA
DE AÇO CROMADO - COM ANÉIS E
BOLAS

ABNT 15965

3E 01 01 01 00 00 00 Porta

0M 01 01 01 00 00 00 Madeira

0M 01 01 01 02 00 00 Imbuia

0M 01 01 01 02 00 00 Cedro

3R 02 04 01 00 00 00 Instalado(a)

3R 02 04 01 00 00 00 Encabeçado(a)

3R 02 04 01 00 00 00 Sarrafeado(a)

2C 02 04 01 00 00 00 Dobradiça

2N 02 04 01 00 00 00 Carpinteiro

2N 02 04 01 00 00 00 Ajud. Carpinteiro

SINAPI

90822

PORTA DE MADEIRA PARA PINTURA,
SEMI-OCA (LEVE OU MÉDIA),
80X210CM, ESPESSURA DE 3,5CM,

INCLUSO DOBRADIÇAS -

FORNECIMENTO E

INSTALAÇÃO

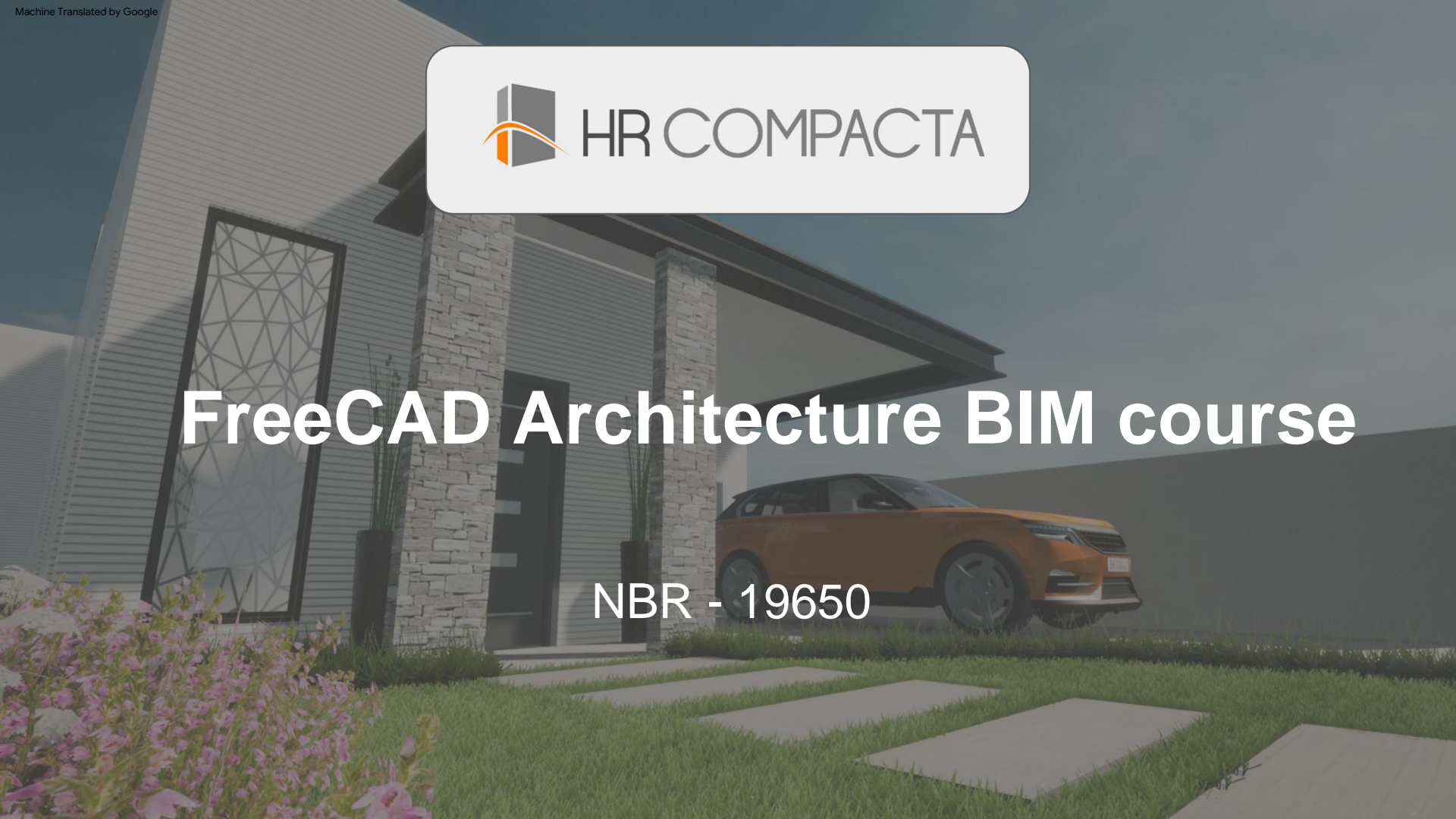




HR COMPACTA

FreeCAD Architecture BIM course

NBR - 19650



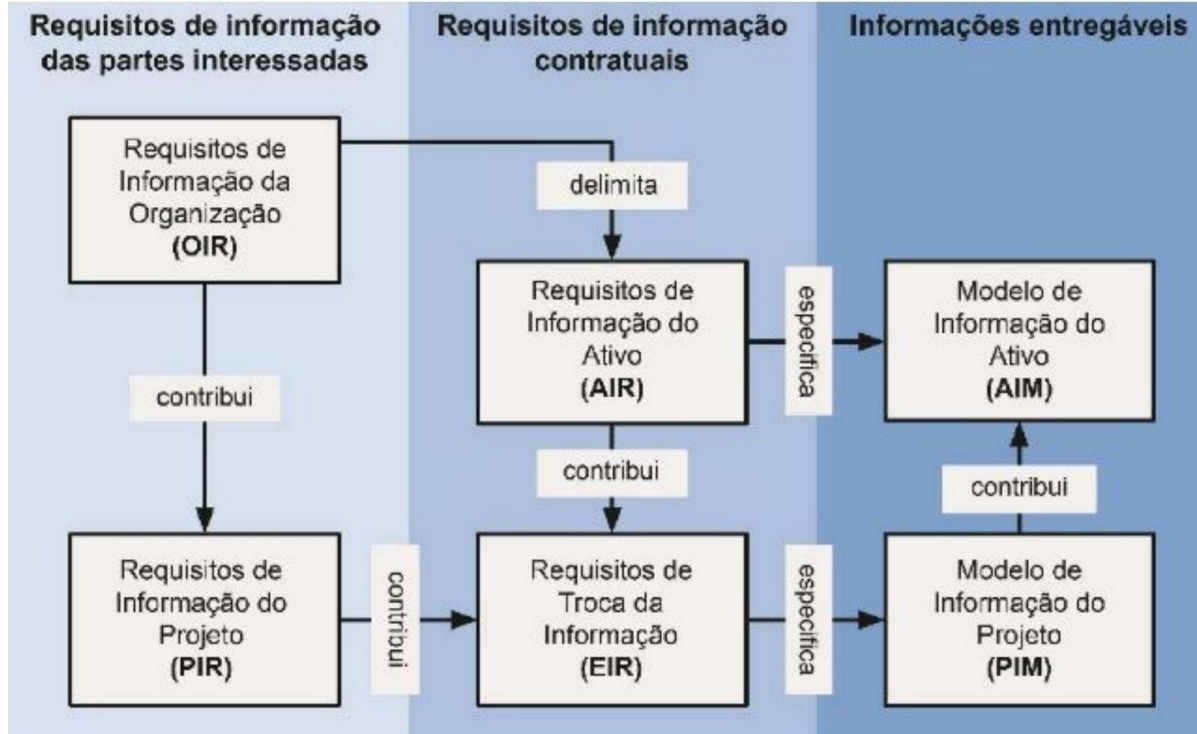
I UNDERSTAND THE IMPORTANCE

The ABNT NBR ISO 19650 standard is an international standard that aims to establish the best practices for information management in the construction sector.

It is important to note that this standard is applicable to all phases of a work, from the beginning of the delivery phase to the end of the use phase.



DIFFERENT TYPES OF REQUIREMENTS



GOAL

The main objective of the ABNT NBR ISO 19650 standard is to promote the effective collaboration and integration of the actors involved in the construction process.

In addition, the standard seeks to establish a common model for information management in the sector, in order to guarantee the consistency and quality of the information used throughout the process.



APPLICABILITY

The ABNT NBR ISO 19650 standard is applicable to all phases of construction, from the beginning of the delivery phase to the end of the use phase.

It is important to note that this standard is applicable to all types of projects, including building, infrastructure and installation projects.



BENEFITS

The application of the ABNT NBR ISO 19650 standard can bring numerous benefits to the construction sector, including:

- Improved quality and consistency of information used during the construction process;
- Promotion of effective collaboration and integration of the actors involved;
- Reduction of errors and delays during the process;
- Increased efficiency and effectiveness of the construction process.



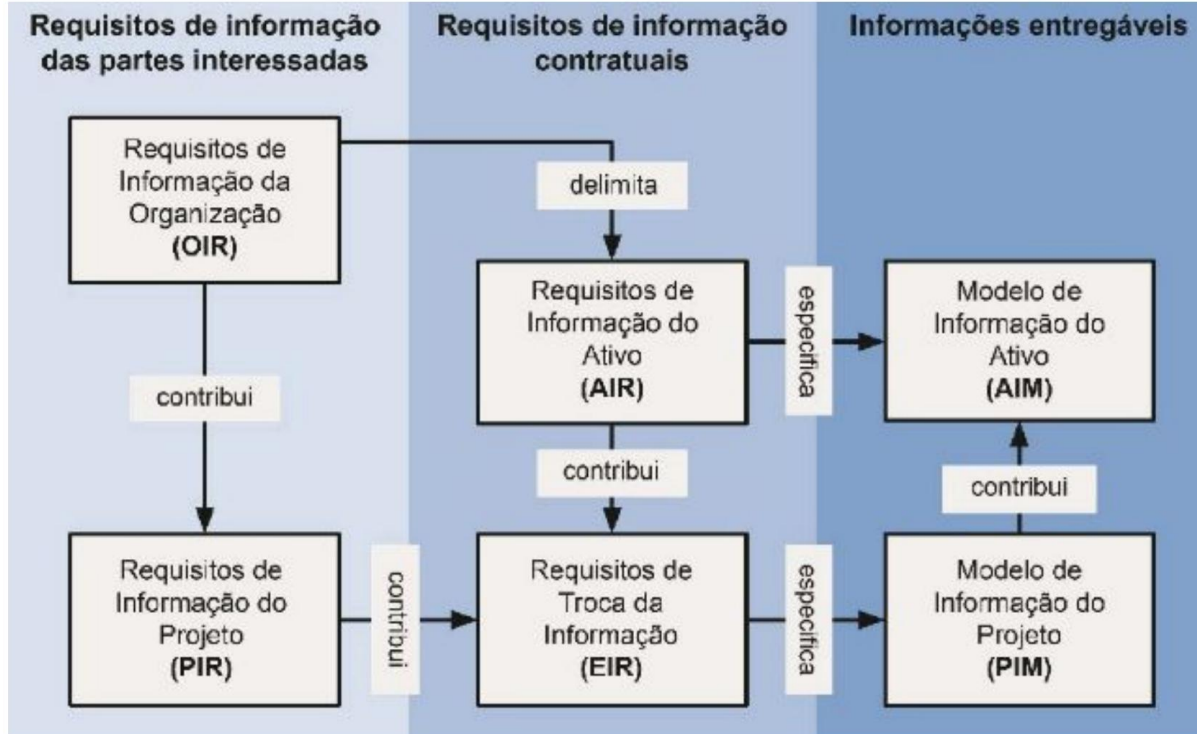
KEY CONCEPT

Some of the key concepts of the ABNT NBR ISO 19650 standard include:

- **Virtual Building Model:** is a digital representation of the building, including information about architecture, structure, facilities, etc.
- **Information Management:** is the process of collecting, organizing, storing and retrieving relevant information during the construction process.
- **Actors Involved:** are the people and organizations involved in the construction



DIFFERENT TYPES OF REQUIREMENTS



UNDERSTANDING THE REQUIREMENTS

Organization Information Requirements



The OIR is a high-level requirement that determines the information required by an organization for decision making. The aim is to ensure that information is provided correctly and completely.



UNDERSTANDING THE REQUIREMENTS

Project Information Requirements



The PIR is an information requirement that is necessary for decision making regarding a specific work order. Each decision point must have a section of the PIR that will be completed during the course of the project.



UNDERSTANDING THE REQUIREMENTS

Asset Information Requirements



AIR defines the information that providers must deliver about the asset, communicating to service providers what they need to provide. This ensures that the information is correct and useful for the use and management of the building.



UNDERSTANDING THE REQUIREMENTS

Information exchange requirements



The EIR specifies the information that must be delivered in each information exchange, ensuring that information is correctly delivered and that specific activities are fulfilled during the project or operational stage.



UNDERSTANDING THE REQUIREMENTS

Asset Information Model



AIM is a model that provides useful information for the use, management and maintenance of the building. It includes information about installed equipment, installation and maintenance dates, maintenance schedules, and other important data.



UNDERSTANDING THE REQUIREMENTS

Project Information Template



The PIM is a model that contains useful information for the design, production and implementation of the property. It includes dimensional, quantitative, and technical data and is generated from the project management and asset management processes.





HR COMPACTA

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BIM universe

BIM UNIVERSE



O BIM é o ciclo de vida da edificação.
Fonte: Autodesk, adaptado Mancione (2013).



WHAT IS A PROJECT NOTEBOOK IN BIM



Each city, state and even countries are creating guidelines on how they want to receive these files in BIM, not simply delivering a 3D model. It also needs to meet the coordination of public bodies.



