



**SAVE** MARCH 21-23  
**the DATES 2018**  
Guadalajara **MEXICO**

# *“Trying to Avoid Confusion in the BIM Implementation both in Companies and in Universities”*

2nd North American Center for Collaborative Development Conference -  
**"Education 4.0: Enhancing North American Competitiveness, Innovation and  
Entrepreneurship"**

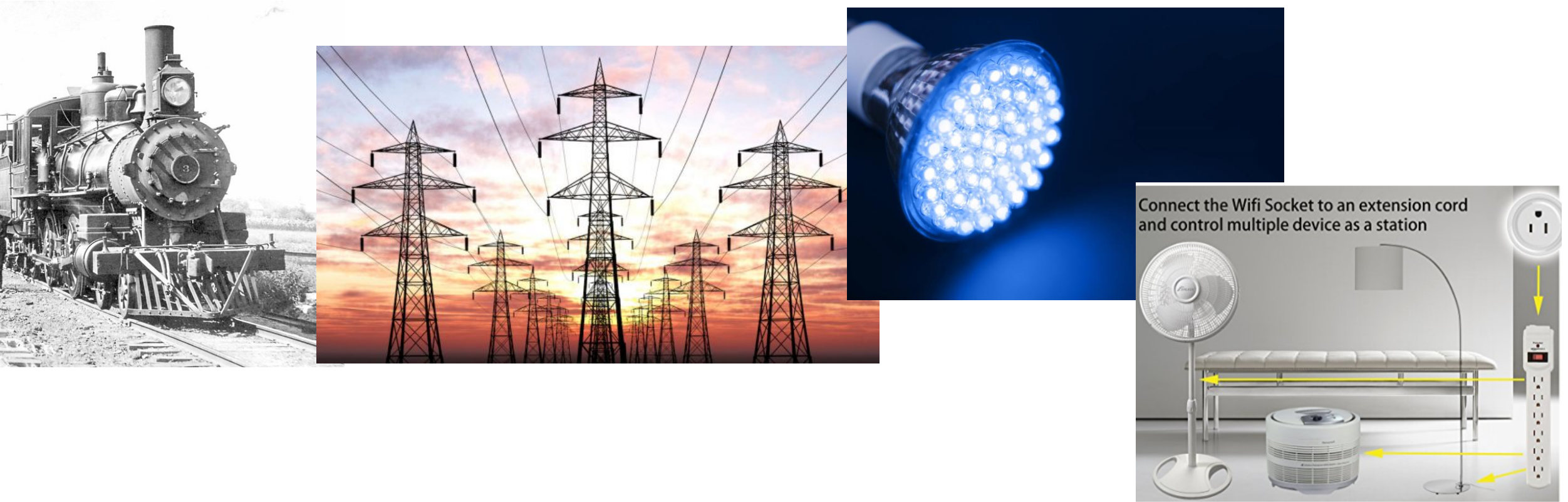
Guadalajara, Jalisco, México,

22 Marzo 2018

# Índice

- Antecedentes
- ¿Que es BIM?
- BIM en la Universidad
- BIM en las Empresas, caso: Alba Calculo estructural
- Conclusiones

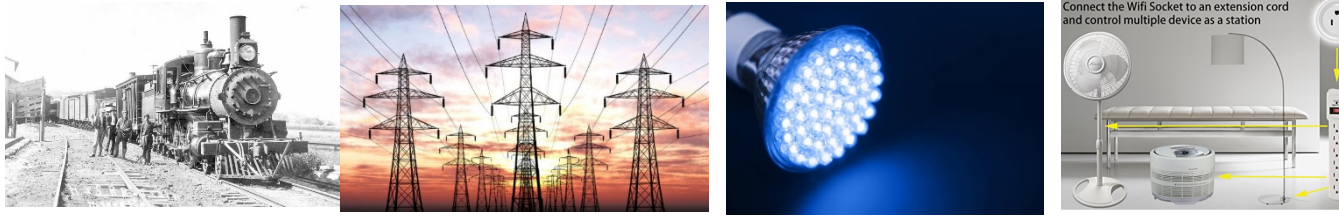
# Revoluciones industriales



- Primera revolución industrial, **maquina de vapor**, creación -de fabricas 1550-1917
- Segunda revolución industrial, **electrificación**, industria moderna 1917-1970
- Tercera revolución industrial, conciencia respecto al **medio ambiente** 1993-a la fecha
- Cuarta revolución industrial, administración de la **Información**. 1995-a la fecha



# Revoluciones industriales



- First industrial revolution, steam engine, creation -of factories 1950-1917

the steam engine is invented, the industrial age begins.

- Second industrial revolution, electrification, modern industry 1917-1970

electrification of each corner of the country, having access to the electric service allows to have televisions, refrigerators, washing machines. etc. that represents a better quality of life, just as it is today with access to the internet.

- Third industrial revolution, awareness of the environment 1993-to date

sustainable development, after many years of producing and polluting, now you want to be green. LED lights, electric cars, biodegradable materials, etc. are developed

- Fourth industrial revolution, information administration. 1995-to date

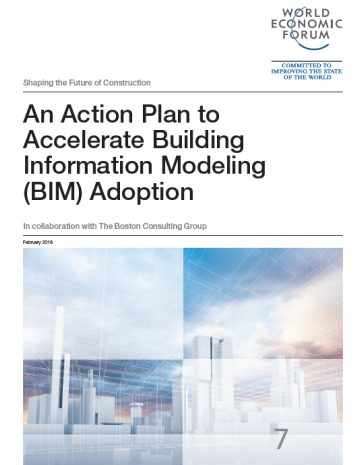
Finally, the information is generated and shared from many sources. To make decisions, the opinion of many people is analyzed, for example trivago, so now, to design buildings, data from many sources is used.

what is BIM?

# An Action Plan to Accelerate Building Information Modeling (BIM) Adoption

*BIM is a **collaborative process** in which all parties involved in a project use three-dimensional design applications, which can include additional information about assets' scheduling, cost, sustainability, operations and maintenance to ensure information is **shared accurately** and consistently throughout total assets' lifecycles.*

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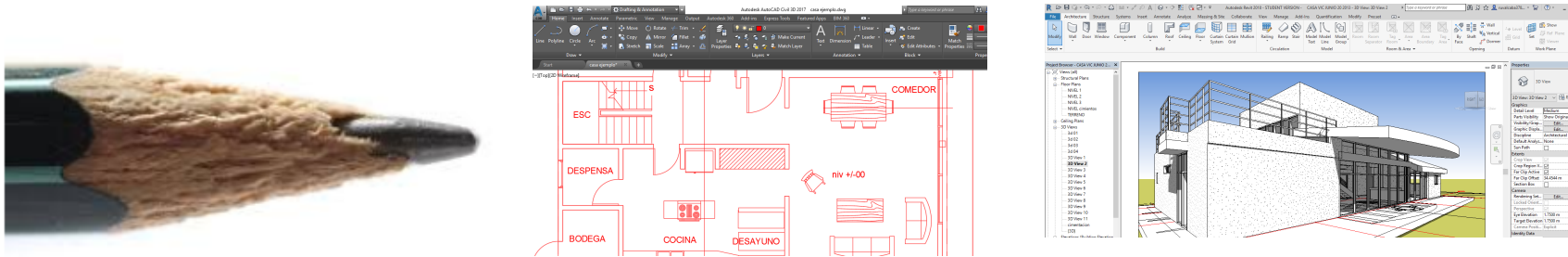
BIM

IT IS A PARADIGM SHIFT

BIM

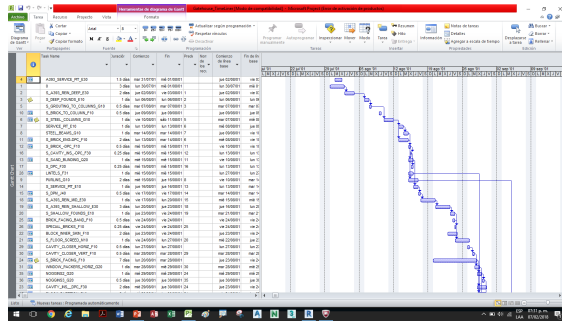
IS COLLABORATION

# It all starts with the planes



- the elaboration of plans began with pencils and continues with AutoCAD. Today the most advanced technology is used to create BIM models. 3d models capable of storing graphic information, dimensions, length, width, volume, etc. and non-graphic information, cost, time, specifications, etc.

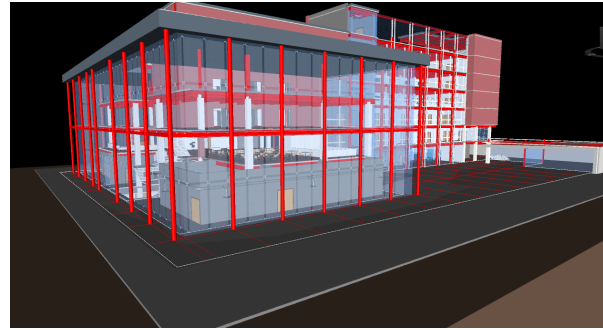
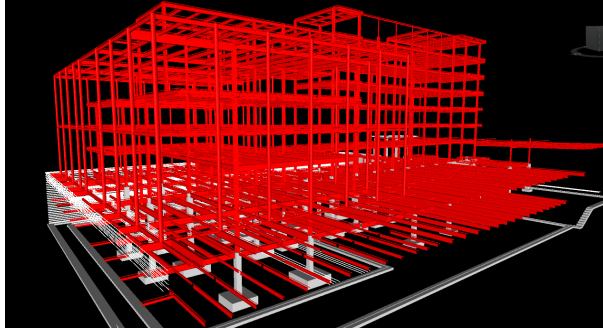
# BIM 4D, REVIT Y NEODATA



BIM models can exchange non-graphic information with computer programs, cost analysis, specialized in analysis and work schedules.



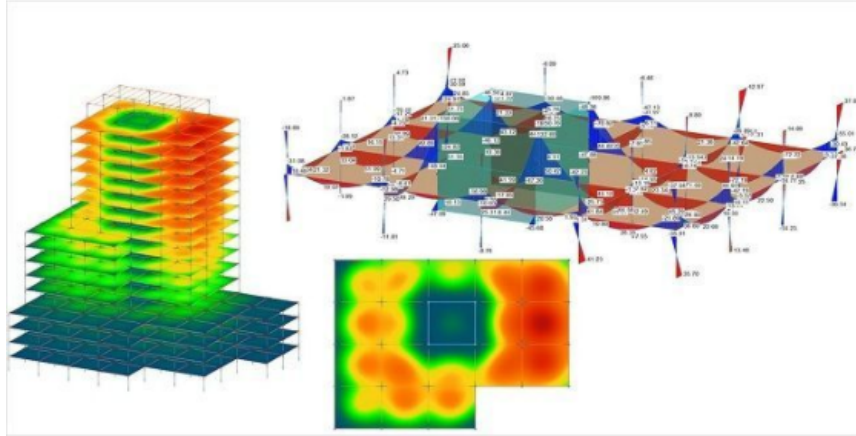
# BIM IS COLABORATION



BIM models can exchange graphic information between civil engineers and architects. between the office and the construction site.

# Structural models

We can see the result before building it



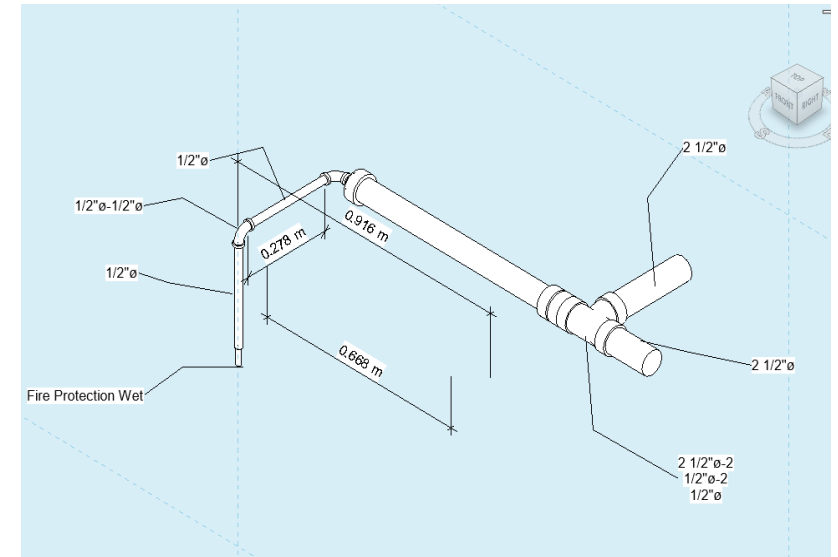
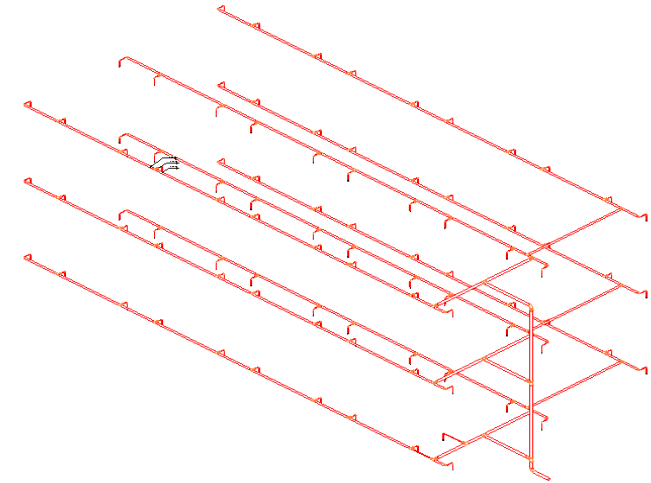
with the BIM model you can do structure analysis as in this example where you can see the behavior of the structure with colors. with the BIM models you can do analysis or simulations of time, cost, structure, evacuations, winds, etc.

<https://www.civilmac.com/blog/estructuras/que-es-el-analisis-estructural/>

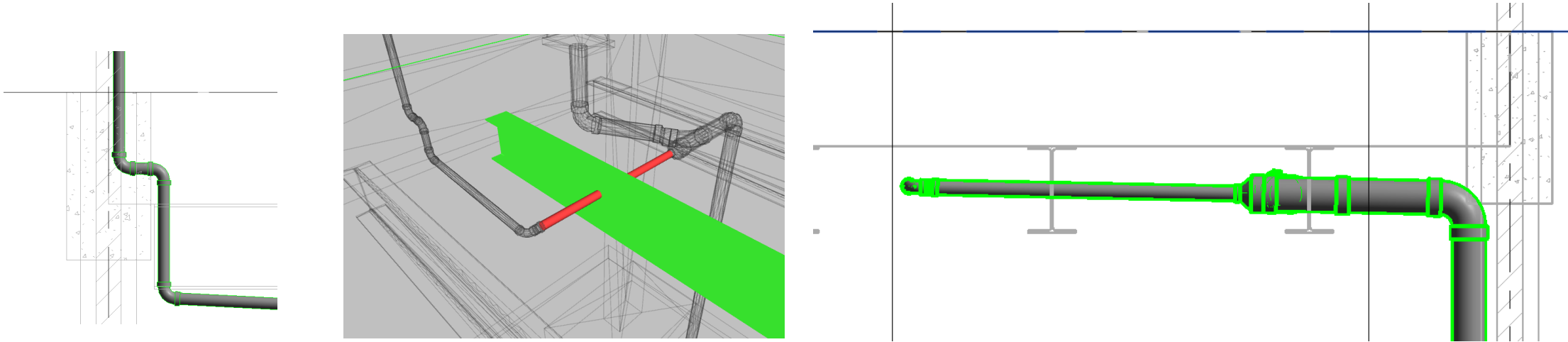
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# BIM real pipes

este es un ejemplo de un modelo BIM simple, en este detalle vemos un rociador contra incendio, tubos, codos, etc, este mismo dibujo en tecnologia antigua (AutCAD) seria solo una linea.

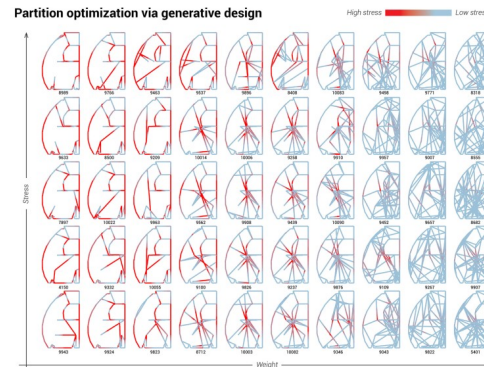
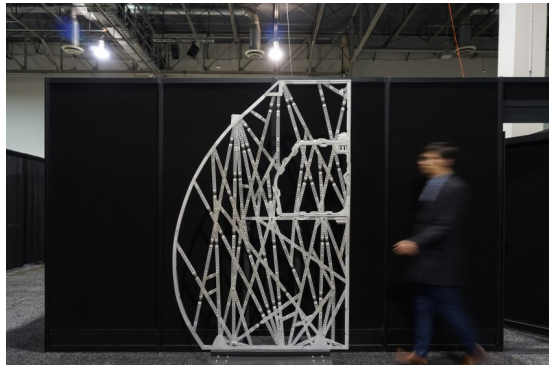


# Clash Detection analysis

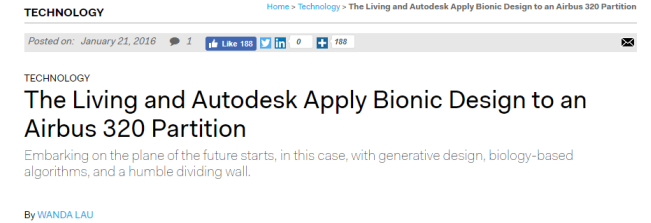


este analisis de deteccion de colisiones es una de la mayores razones para utilizar modelos BIM. el programa de computo detecta el choque entre un tubo y la estructura antes de llegar al sitio de construccion, este error es mas barato de reparar si se detecta temprano.

# Generative design



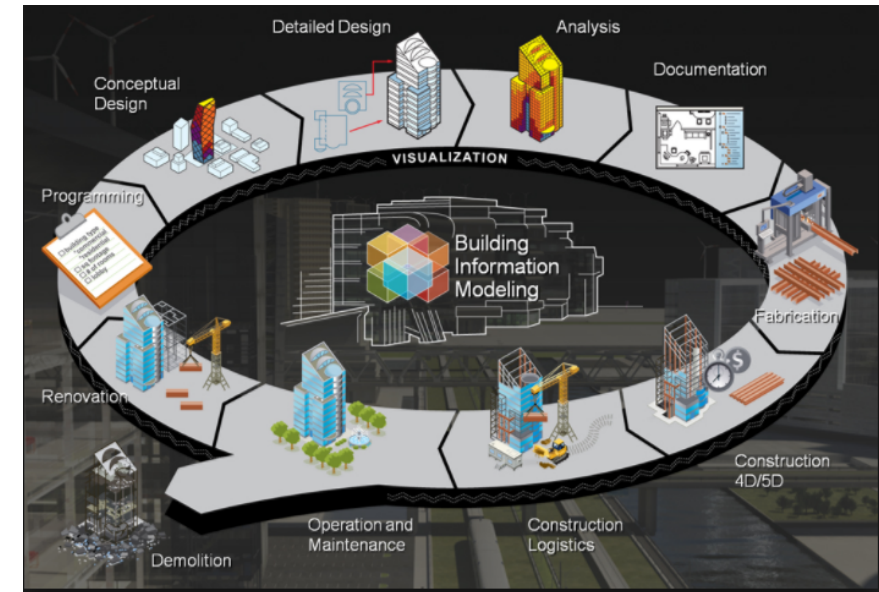
the generative design is already a reality but it will be much more used in the future. the computer program generates 10,000 different design alternatives, the computer program selects the best three based on cost, resistance, etc., and the designer takes the control and chooses the best option, then develops it to the end.



# BIM

Articulate BIM's benefits across the entire lifecycle.

BIM models are useful not only for design and construction, but for the entire useful life of the building. The operation of the building is longer than the construction period. A building is inhabited for 100 years and is only built in two, therefore the operations are more important for the owner than the temporary cost of the design and construction.





# BIM at the University

# KNOWLEDGE VS TECHNOLOGY



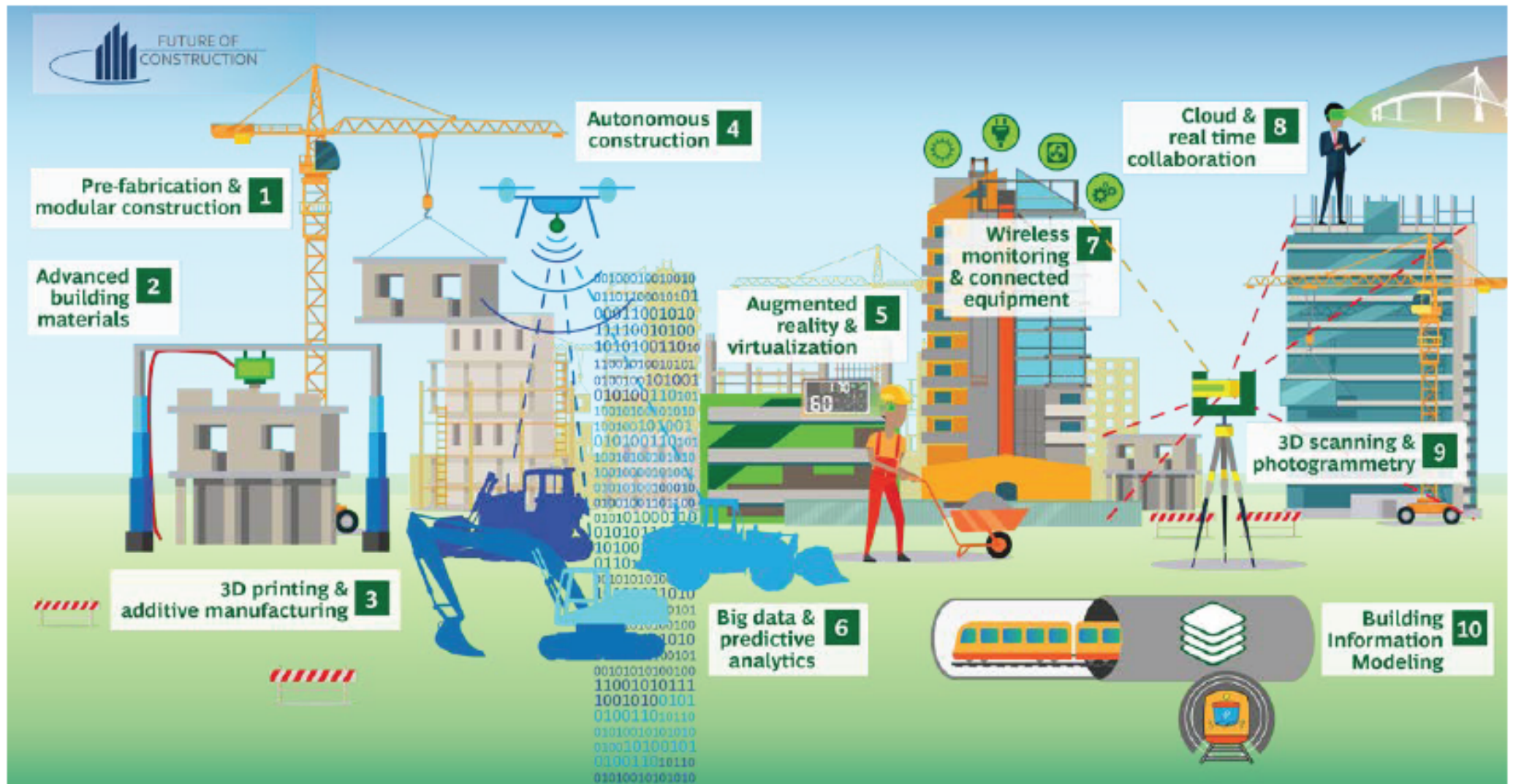
- RECURSOS FISICOS
- RECURSOS HUMANOS
- PLANES DE ESTUDIO
- COLABORACION ENTRE AEC E IT

There are universities that have computer shortages, there are also other universities with many resources but that computer labs have very strict rules for the use of computer programs.

The university has teachers who have taught for many years and are resistant to change, to learn and use new technologies.

The study plans change every 5 or 10 years while the computer programs are updated for 6 months. which generates a gap between general knowledge and technology.

Architecture and civil engineering, are in different buildings. This is a mistake, students, teachers and curricula must be united. Buildings and building designers depend a lot on electronics.



Source: World Economic Forum, The Boston Consulting Group

There are new technologies that impact the construction industry.

The robotics, the internet of things, 3d printing among others must be integrated into the curriculum.

# Architecture curriculum

This is an example of the curriculum. The student must pass 54 subjects to be an architect.

In it, some BIM matter has been included. Before it was at the end. Today is at the beginning. The idea is to practice with BIM models for years. But this is not happening.

The student has 54 different subjects, with 54 different teachers, with 54 different classmates.

The system is made so to be able to learn the knowledge in small parts and then join it in the end.

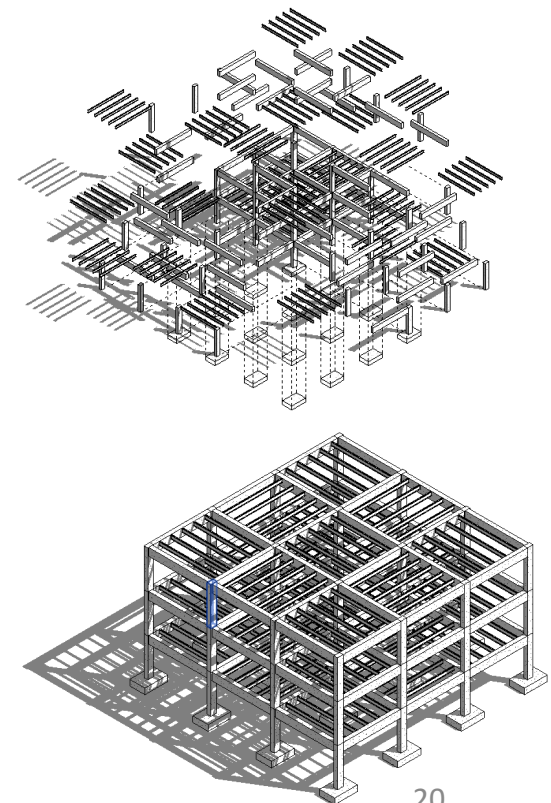
The student makes small projects within a subject.

The method is correct, but the burden of joining all 54 pieces at the end falls on the student.

Would it be great if a subject or a teacher would help the student 2,3 4 semesters and help her put the puzzle pieces together?

In order to learn BIM correctly, it is also necessary that BIM models are used in all subjects.

Semestre	1	2	3	4	5	6	7	8	9	10
Control profesional de la arquitectura										
Metodología aplicada a la arquitectura										
Análisis básico del contexto urbano										
Reservas urbanas contemporáneas										
Programación urbana										
Planificación urbana										
Historia y teoría de la arquitectura del siglo XX										
Historia y teoría de la arquitectura del siglo XXI										
Equipamiento urbano										
Contexto y patrimonio cultural										
Proyecto de Aplicación Profesional I										
Proyecto de Aplicación Profesional II										





# Retos de dibujo BIM

In the city, drawing competitions were organized to promote BIM's participation.

Young people are very excited about this technology, the problem is the old generations who reject it.

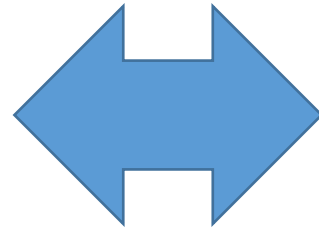
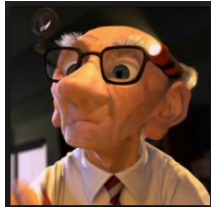
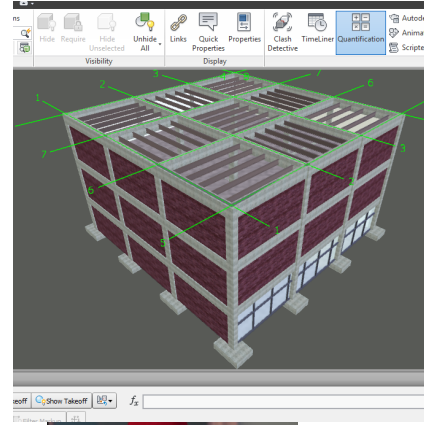
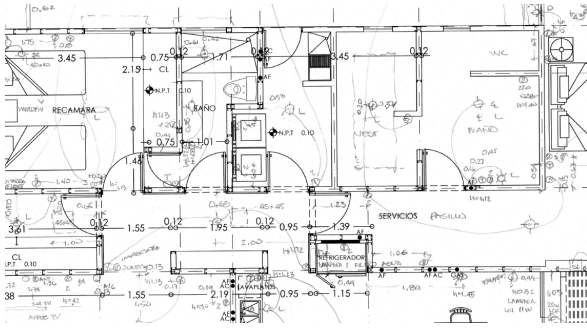


# Hollywood BIM, real BIM

BIM Models can be used to show or  
can be used to improve the quality of  
construction and develop better  
projects..







Young people will use the new technology in any way. The important issue is that they can make mistakes faster using the computer. We are in a transition zone. The challenge is that the deep knowledge of the design and construction of buildings of the old generations must be transferred and assimilated by the young people. the new buildings must be much better than the old ones.

BIM in Companies, case:  
Alba Structural calculation

# Transformation of paradigms

"I've always done it that way and it worked."

- Detachment to tools and traditional technology.
- Isolated processes to collaborative.
- Promote cultural change in clients and other participants.
- Share knowledge and positive and negative experiences during and after implementation.



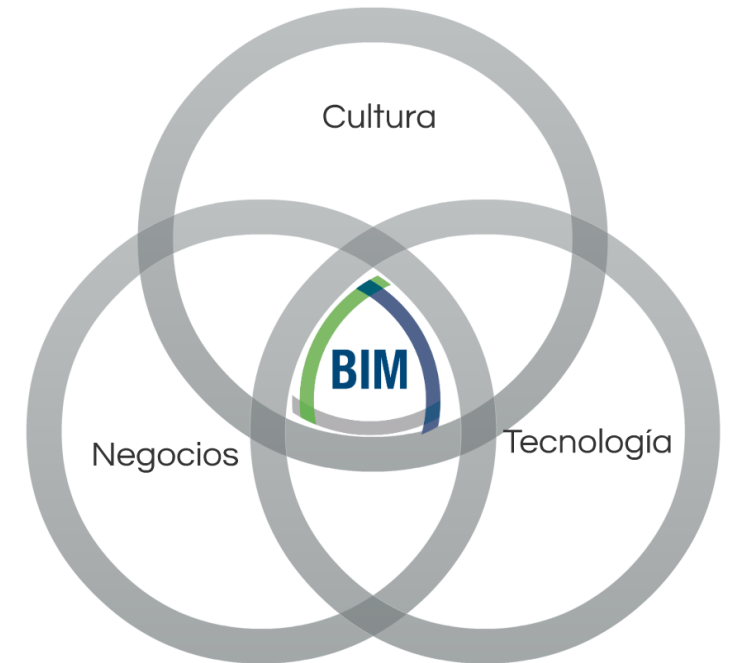
# Knowing our processes

- You can not correct something if you do not know that something is wrong.
- It is crucial during the implementation to analyze the processes that the company currently has to define the areas of opportunity and the BIM uses.
- Be self-aware of the number of subprocesses, the participants and the duration of their activities.



# Training and implementation

- It is the final part of the adoption.
  - A training and updating plan is required.
- Define who is targeted and with what depth it will be given.
- The big challenge is to generate a reasonable expectation of benefits and keep the interest alive.
- An implementation with an adequate level of maturity takes between 4 to 6 years.
- There is no recipe, each case must be treated in a particular way.





# Implementation process - committee



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# Conclusions