

BIMarabia

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INTRODUCTION

IN THE NAME OF ALLAH

The technologies that have been elaborated in the engineering offices considering their sizes and the sizes of their implemented projects are no longer hidden. However, the criterion is choosing the best and the appropriate, this is the judge to achieve systems that work according to our standards, in order to deliver distinctive quality at work rather than systems which we can only follow in their methods of work (which may sometimes develop the policies of their manufacturer country). This shall be a disaster rather than a success.

BIMarabia magazine is a beacon of BIM science and technologies, in particular for those who wanted to learn these sciences and know what they can offer and which consequences they should avoid of these techniques. These techniques are either new and have not been tried yet or conditionally, limited used techniques on harsh conditions which are not fair to be purely theoretical. Then knowing the best-applied methods in practical life and even notable than that is that never there was a fence between author and reader and it is only an email address that separates between the reader who should correspond with the author to give advise and consent about a subject or having another topic further.

It is also characterized by honesty, as there are reimbursements to Authors whether in money or reputation. It is purely diligent of the professors' writers who hit or miss and welcome to the corrections from the reader side who has already noted the subject we wrote to correct the rest of the readers.

Besides, we are proud of what professionals provided with all the updated in the project management science. In this issue, we see many new techniques and useful presentation and in details on stages of work in engineering projects, as well as new methods in electronic management and cost accounting.

As for the BIM and the latest developments in its systems and methods of submission of documents and the life cycle of work, we will also see more than one article to address these topics in a non-boring detail accompanied by comments from the writer for more benefit.

As for the BIM software, there is a rich share of Revit fans to discuss a number of bold and unprecedented topics (at least in our Arab world) written by capable and experienced professors.

And much more ...

We thank you for your interest and your knowledge. Hopefully, we will be able to offer the best and see you in the coming editions.

Best regards, Moaz Al-Nagar



BIMARABIA
TEAM

Omar Selim

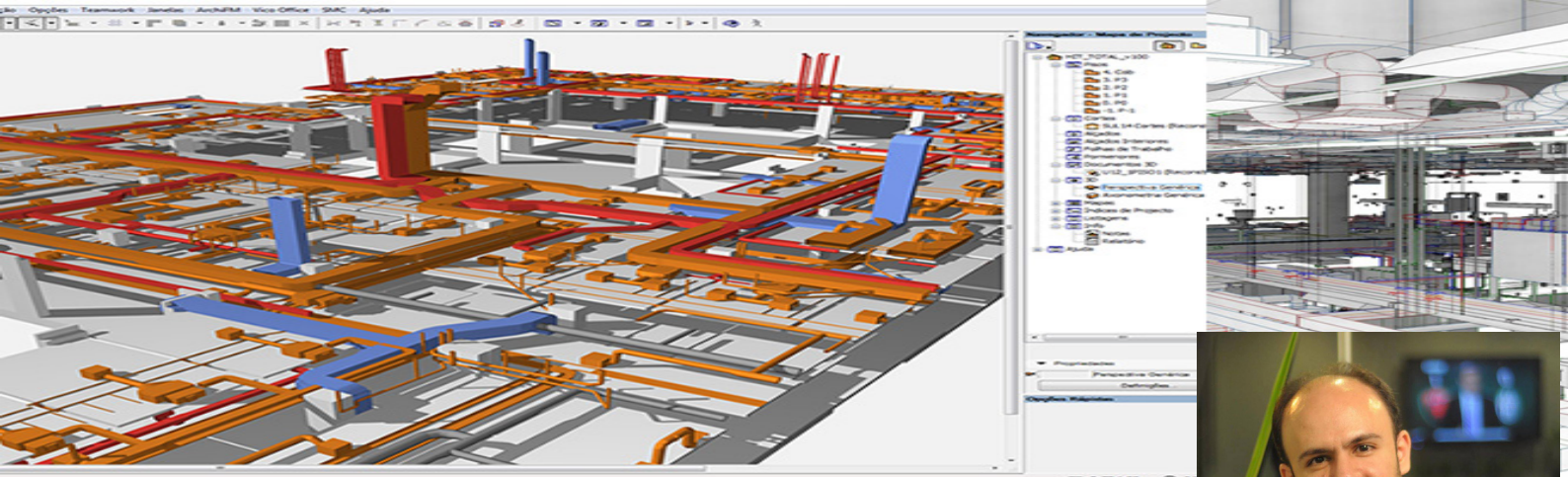
Eng. Hamza Faisal Moshrif

Eng. Sonia Ahmed

Eng. Shirley Makram

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INTEGRATION OF BIM WITH IFC IN ENGINEERING PROJECTS

What is IFC?

The AEC projects of the (Architecture, Engineering, and Construction) are projects with a huge amount of information shared between several systems doing so (construction, mechanical, electrical and others). These projects contain within their stages (such as planning, implementation, delivery, and maintenance) an enormous amount of details that lead as a whole to the integrity of the engineering work and present an integrated project to minimize the errors that inevitably occur in such projects.

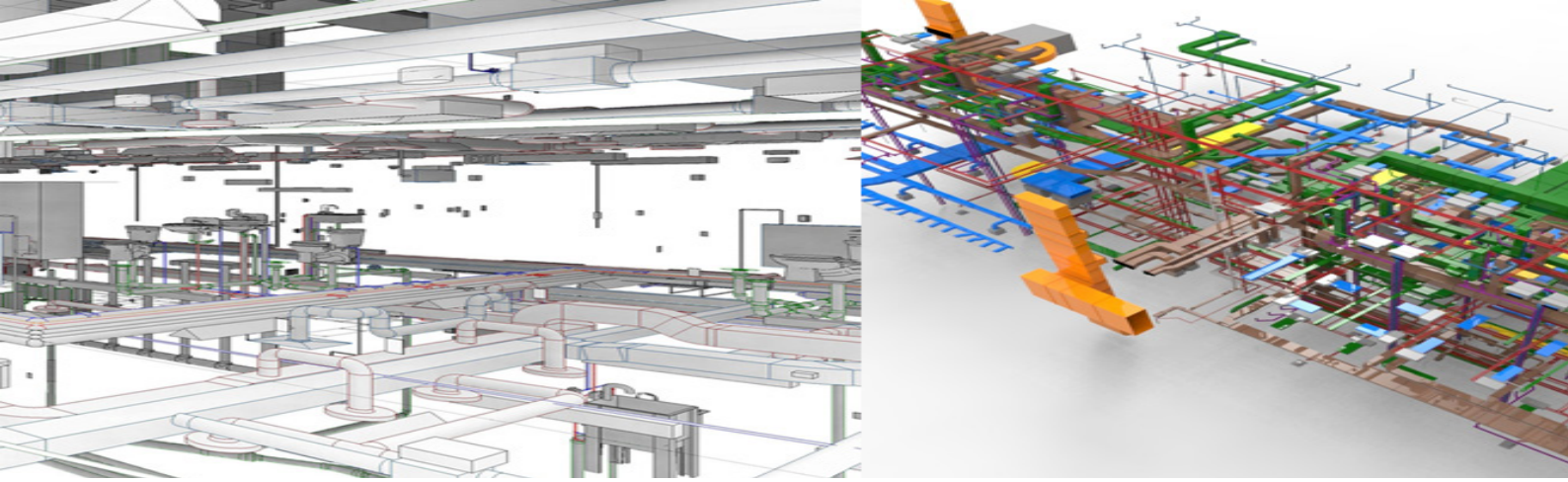
In order to do so, there is a common language for handling data between different systems based on these projects so that trading data is standard as much as possible so that the companies (they are often different companies gathered to work on the same project) will be capable of exchanging data back and forth between them in a standard way which is not related to a company or a system itself, but rather to be standard as much as possible to contribute in providing integrated project with few errors and gaps as much as possible.

This is called IFC (Industry Foundation Classes), it is an expressive name about common ground Foundation or rules as we also can call them. But using dry rules only is not considered an integrated work within a sea of rules and variables within the medium complex engineering project. Therefore a platform must be there which can understand these rules and submit them to the user, BIM systems depends on these projects and this platform that are working out in a medium projects or very complex on (unfortunately, some desks engineers who work on simple residential projects or the which is called Sole Practitioners consider the use of BIM too huge for such small projects.)

What is the BuildSmart?

Reading above suggests that, the enormous quantity can be expected from the specifications that will be placed within the same project, regardless of its size. However, it is taken for granted that we are compelled to exchange information between different systems that in the project we will work on (As mentioned above: structural, mechanical, architectural design, electrical and even financial accounting). This is when we talk about a single project in the country within an engineering office. If

Moaz El Nagar



we have circulated the idea on a large scale or national companies which are working on huge projects (whether facilities or infrastructure at the level of state) we will notice besides the high volume of specifications we will have another subject, which is standard at work. In other words, we will have to govern projects with agreements when several parties get involved in implementation to control the specifications and scope of all sides, whether companies or offices.

From here comes the idea of Building SMART. It is considered as a reference in the European country about buildings specifications and construction processes (www.buildingsmart-tech.org), it is a government website which isn't owned by a particular country or union or body, but rather is a result of multiple committees of different states, governments, and work natures. It sets buildings and facilities in terms of development, evaluation, and improvement, either by project or by the nature of those facilities to be compatible concerning specifications with the standard specifications for buildings worldwide (or European, at least) due to the European origin of the location.

This applies to the United States; however, there are several bodies and number of companies which set specifications and make them a standard in America.

Building SMART site helps to include the standard specification, to give certificates for buildings that meet those specifications, or at least to help offices and companies which work on projects to reach those certificates to achieve optimal quality within those buildings.

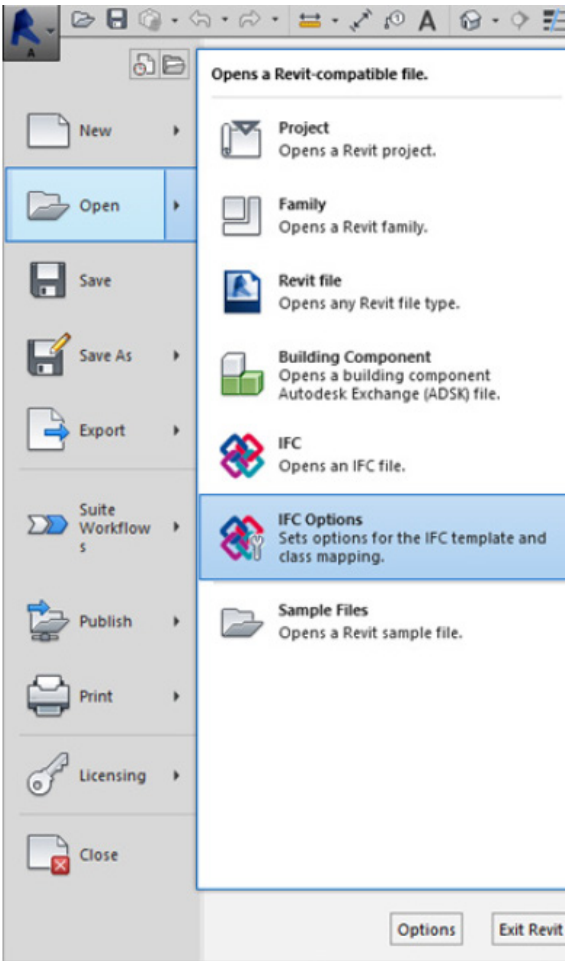
The IFC applications within the BIM systems:

The best way to work with BIM systems is according to this sequence:

1. Saving standards within BIM system which you are working at.
2. Consulting the team who is working on this project, (structural, mechanical, electrical, etc.) on the content of those specifications and the feasibility of its existence within the project.
3. Modifying those specifications needed to serve improvement of work quality of the project.
4. Applying and dissemination these standards at all electronic systems in work.
5. Rechecking specifications during and after work and on several other projects just to make sure of the safety of those specifications.

Note:

In step1, we can import ready specifications from the website that I have mentioned in the previous paragraph and then modify those specifications to be ready according to the rolling system in the country in which we operate Engineering Norm or Code.



An experience of standard specifications management using Revit:

We see in this box the program description way for standard specifications and its titles known in the program, and I put some arrows on specific examples of those elements.

We can here take those specifications and add them or reduce them (as required by the work) then we use it in office, in the company or project.

Now, we will note that the names of those standards are uniformed even in other software existed in the market, as in the next paragraph.

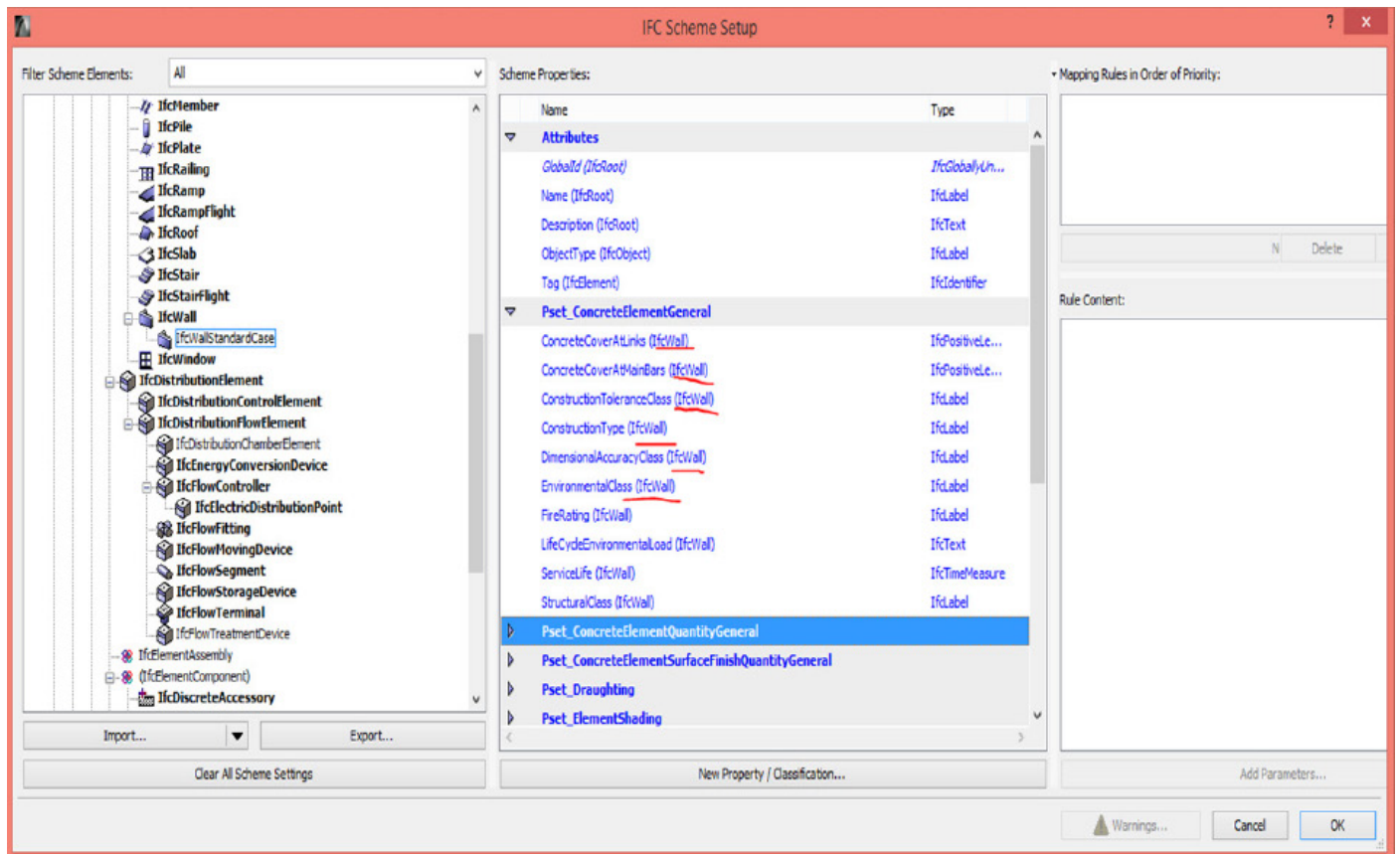
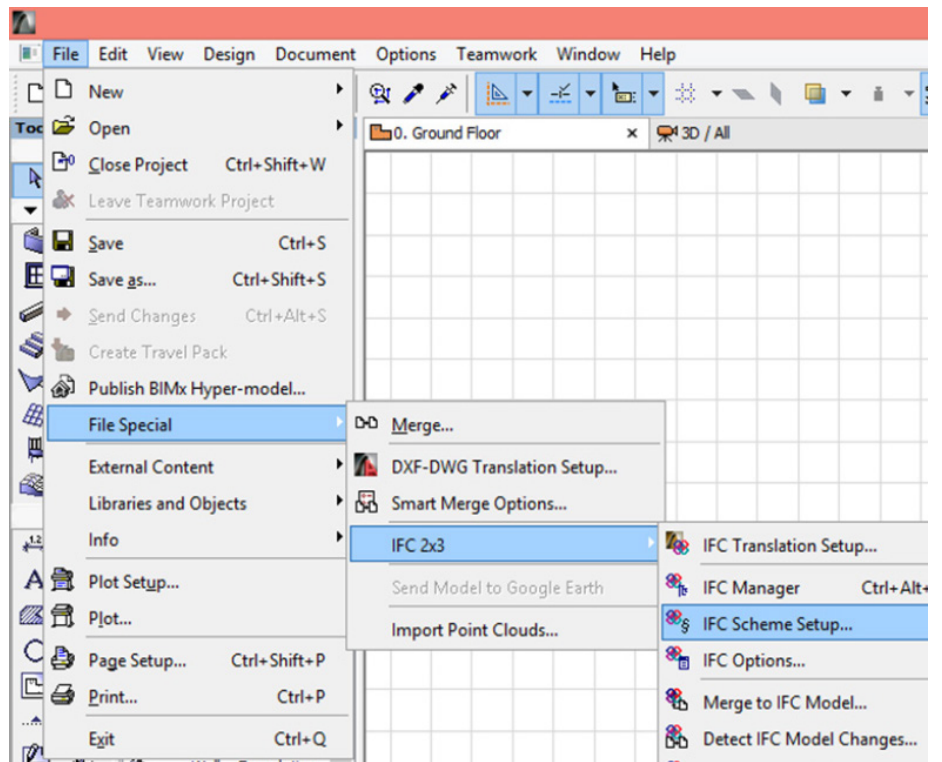
Template for IFC Import:

IFC Class Mapping:

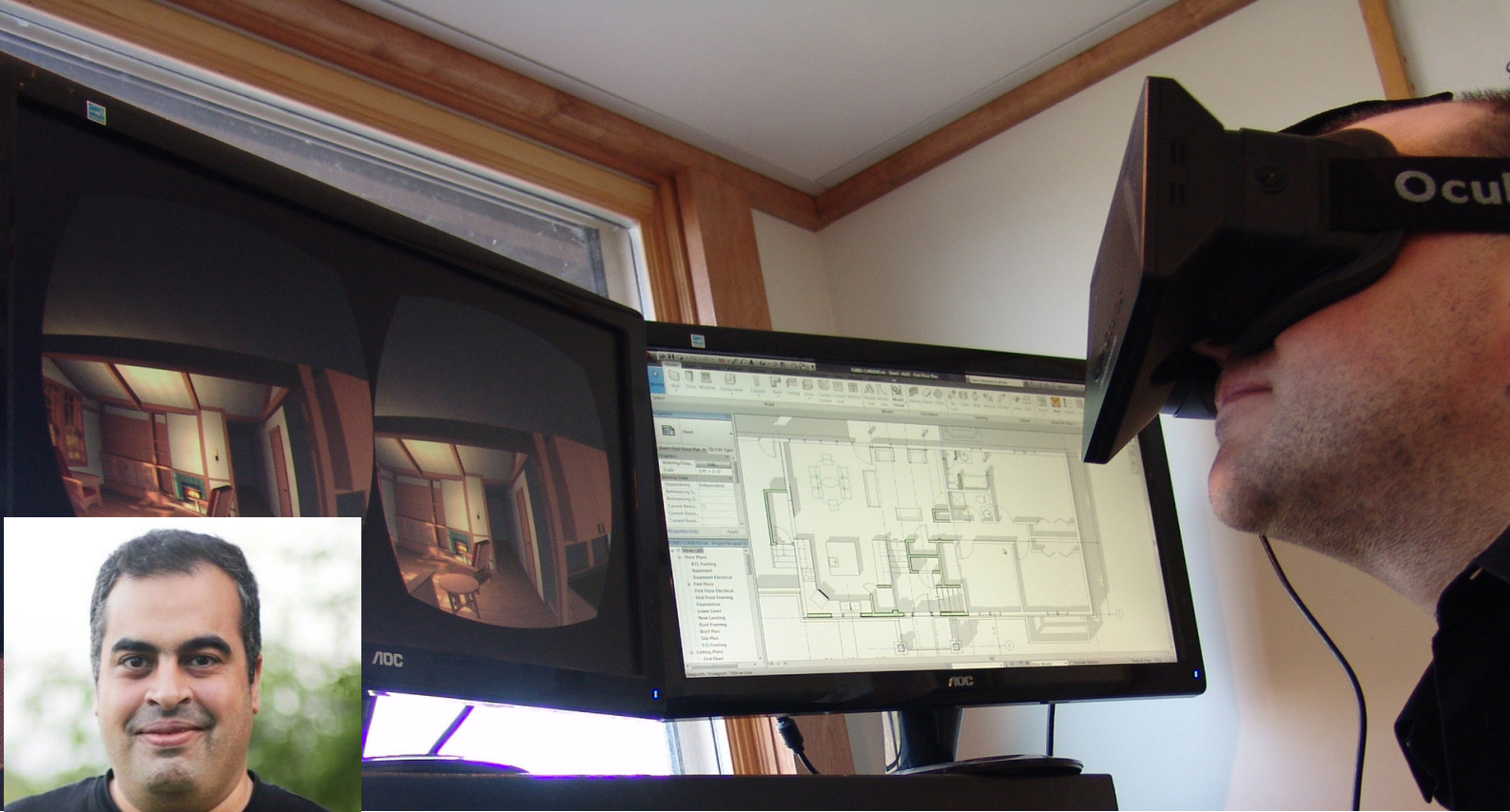
IFC Class Name	Category	Subcategory
inforcingBar	Structural Rebar	
inforcingMesh	Generic Models	
of	Roofs	
nitaryTerminalType	Generic Models	
nsorType	Generic Models	
e	Site	
aceHeaterType	Generic Models	
ickTerminalType	Generic Models	
air	Stairs	
airFlight	Stairs	
itchingDeviceType	Generic Models	
stemFurnitureElementType	Generic Models	
nkType	Generic Models	
ndon	Generic Models	
ndonAnchor	Generic Models	
ansformerType	Generic Models	
ansportElement	Generic Models	
beBundleType	Generic Models	
itaryEquipmentType	Generic Models	
iveType	Generic Models	
all	Walls	
allStandardCase	Walls	
acteTerminalType	Generic Models	

An experience of standard specifications management using ArchiCAD:

ArchiCAD is the first software that offered the idea of IFC due to its European origin and maturation of the concept in Europe before America. File-->FileSpecial-->IFC 2x3-->IFCSchemeSetup...



You can notice directly in the box that the particular value of the wall is IFC Wall, which is the same name used in Revit program as in previous photos. This was not a coincidence, but rather is a result of uniform standard between Softwares to exchange information between them in transparency and uniformity to ensure the engineering quality of work.



BIM AND AUGMENTED REALITY

Omar Selim

BIM is a digital representation of the physical and functional characteristics of a building displayed as a 3D model, with the capability to integrate a whole array of design and construction data related to cost, schedule, materials, assembly and maintenance.

Modern Mobiles have facilitated the spread of this technology.

There is another different expression; it is a virtual reality which is based on replacing the real environment with the virtual environment so that you see the virtual environment only.

How can we benefit from this technology in BIM?

- You can watch an empty room through tablet camera then you can download models of chairs and furniture where you can imagine the place and its area.
- You can go on the project where the camera makes you see walls, all embedded pipes and make you know their locations.
- You can send a plan view of a building to a friend then he can watch the construction as a 3D model through the tablet.
- You can watch all needed information on (VR headset).

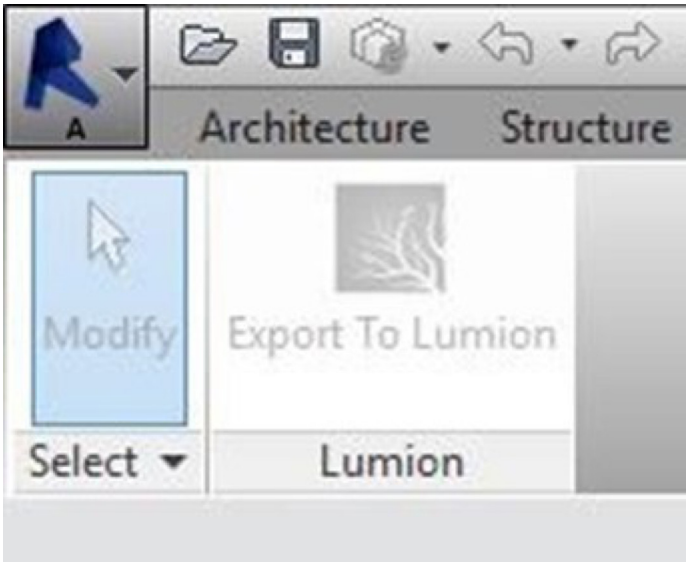
How do we convert the model to AUGMENTED REALITY now?

The basic idea is converting the model to an acceptable formula of AUGMENTED REALITY programs.

For example, the extension of model is DWG in CAD and RVT in REVIT and we want to convert it to an acceptable extension.

You'll find tens of export programs let us take an example:

When we set up LUMION, we can export model from any program such as REVIT, SKETCH UP or ARCHICAD To the DAE.



Then load the model to the following site
augmentedev.com

After applying the steps accurately, you can
see your model by program

<https://play.google.com/store/apps/details?id=com.ar.augment&hl=en>

You can read more here <https://draftsman.wordpress.com//category/augmented-reality>



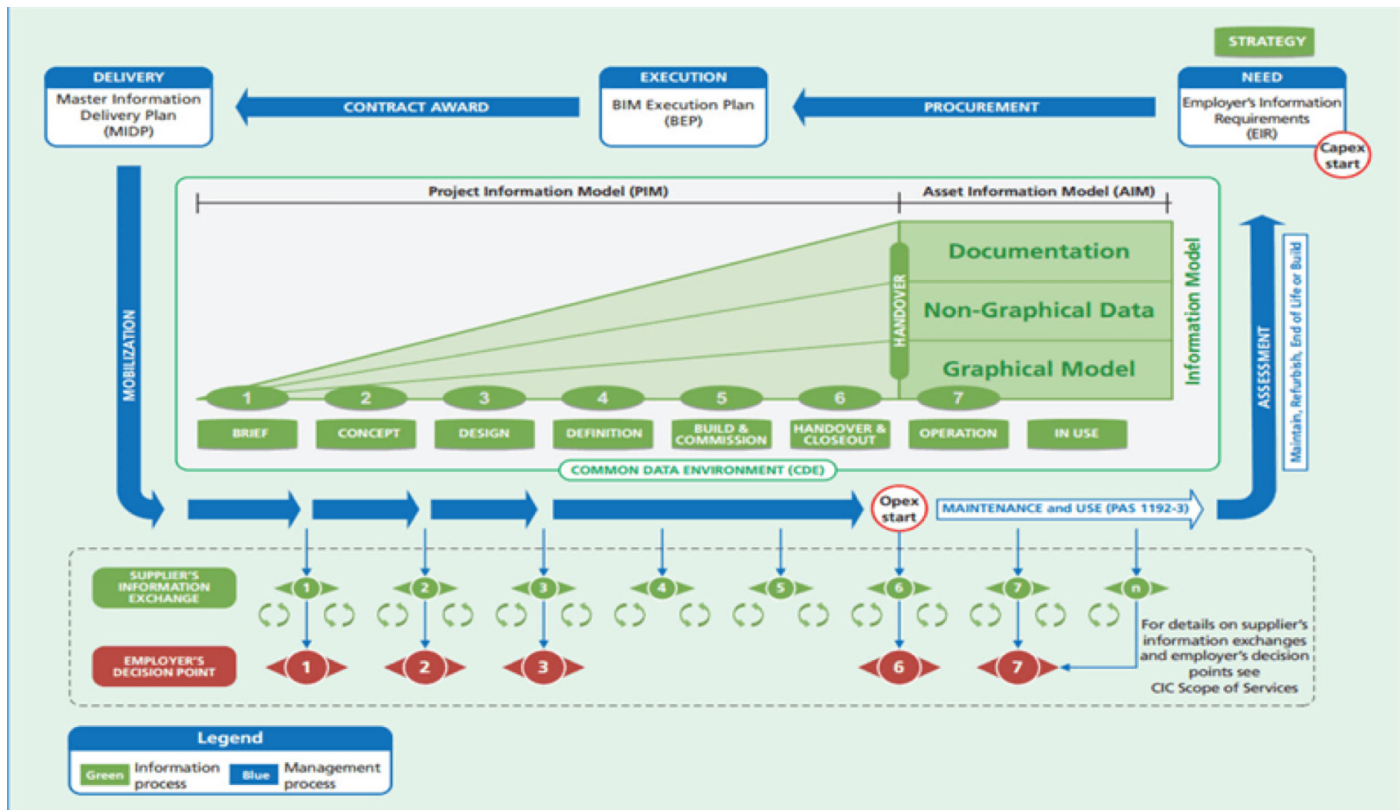
Translated by: Doaa Mohamed.

INFORMATION DELIVERY CYCLE

This image identifies the strategies developed by the British Government, every point needs a whole book, but let's discuss them together.



Omar Selim



We see in this figure a logical framework to produce information in project phases, this approach does not require more work, but requires mutual understanding and confidence within the team. Moreover, by committing to it, we will have less extravagant activities such as stopping work to search for information and defects resulting from poor coordination between the forms and invisible data. There are two beginnings: The first beginning is from “NEED” top right of the figure in case you start a new project, the second beginning is from “Open start” for already existing buildings. Let’s start with the first point “NEED” where we define the information required by employers (BIM Employers Information Requirements EIR), set the strategy and provide a precise definition of the employer requirements and key decision points. We can count on CIC BIM Protocol.

What are software platforms?

- Technical
- Management
- Commercial

Technical	Management	Commercial
<ul style="list-style-type: none"> • Software Platforms • Data Exchange Format • Co-ordinates • Level of Detail (general) • Level of Detail (components) • Training 	<ul style="list-style-type: none"> • Standards • Stakeholder Roles and Responsibilities • Planning the Work and Data Segregation • Security • Coordination and Clash Detection Process • Collaboration Process • Model review meetings • Health and Safety and Construction Design Management • System Performance Constraints • Compliance Plan • Delivery Strategy for Asset Information 	<ul style="list-style-type: none"> • Timing of data drops • Clients Strategic Purpose • Defined BIM/Project Deliverables • BIM-specific competence assessment

And the following form:

Stage 2. Concept

Client's plain language questions may be listed here. The description field below may be used to cross reference tasks and deliverables to questions. This is a project decision.

Tasks

Ref	Task	Description	Responsibility
2.010	Comment on Concept Design proposals.	The Client must have the opportunity to comment as the proposals develop and progress.	Client
2.020	Sign-off Concept Design and Final Project Brief.	The Client should agree to the final versions before they are implemented.	Client
2.030	Comment on Project Strategies as requested.	The Client must have the opportunity to comment as the proposals develop and progress.	Client
2.040	Monitor progress of Concept Design.	This should be measured in accordance with the Design Programme.	Project lead
2.050	Prepare and issue Final Project Brief.	This will result from collating and agreeing alterations to the initial project brief.	Project lead
2.060	Review Handover Strategy and Risk Assessments with project team.	All members of the Project Team will have an input, but one member takes responsibility for organising the process and coordinating the results.	Project lead
2.070	Review and update Project Execution Plan.	All members of the Project Team will have an input, but one member takes responsibility for organising the process and coordinating the	Project lead

Where we define the required and who will perform then PROCUREMENT arrow come out and here we determine the resources needed for the project.

The next step is BIM EXECUTION PLAN and defining roles, responsibilities, authorities, standards and methods, which include:

- Project Implementation Plan
- Supply Chain Capability Summary

Then we move towards the references and a master plan for handing over the project (Master Information Delivery Plan (MIDP)) in which we identify the protocols and procedures for each project phase. Where we identify who will perform each operation and when we do the SCHEDULE which includes:

- Responsibility Matrix

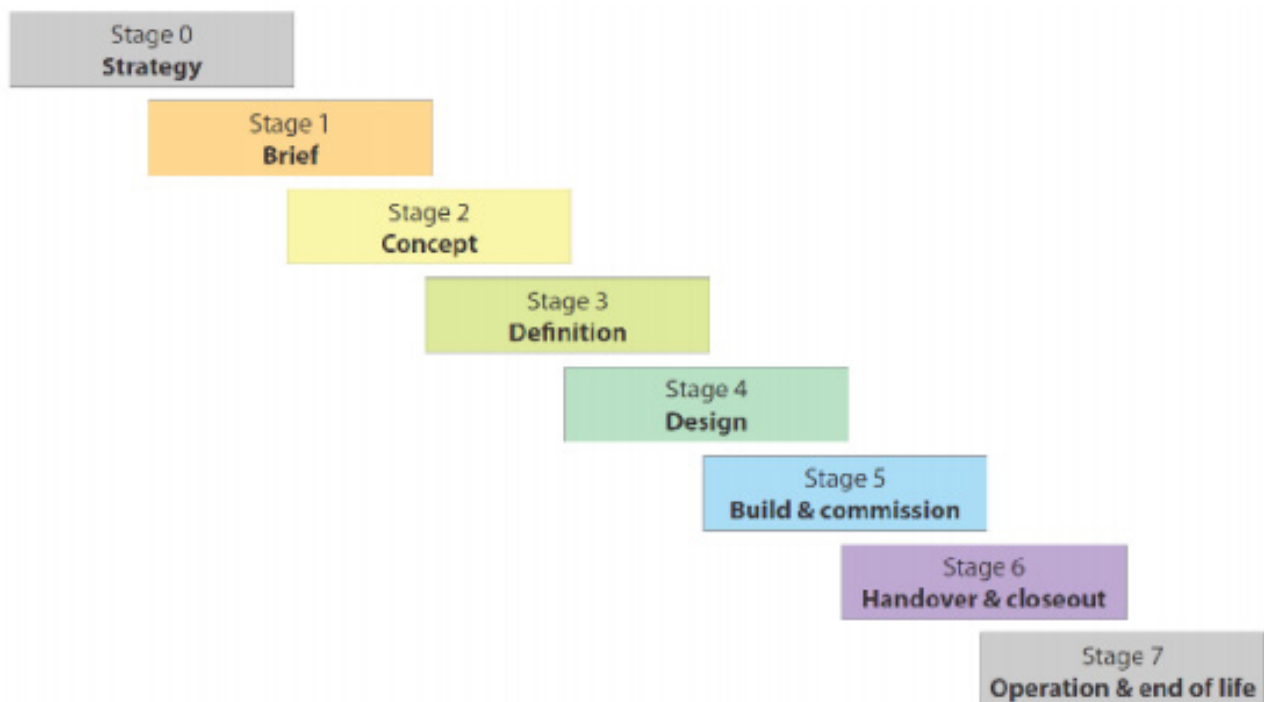
Task Team Information Delivery Plan

By entering the project's operations and at every stage information and details increase until we finish full model upon HANDOVER.



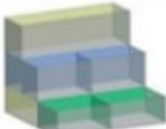








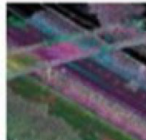
Section 1: PROJECT INFORMATION MODEL (PIM)

It is divided into six stages; there is a seventh stage in the second section. The Seven stages are in the data exchange environment (CDE – common data environment)

UK Government Digital Plan of Work



1. Brief: having a preliminary idea.
2. Concept NOTE: The existence of the principle or the foundations.
3. Design.
4. Build and commission in build and commission stage.
5. Handover and Closeout.

Brief	Concept	Developed design	Production	Installation	As constructed	In use
N/A	All	All	All	All	All	All
						
						

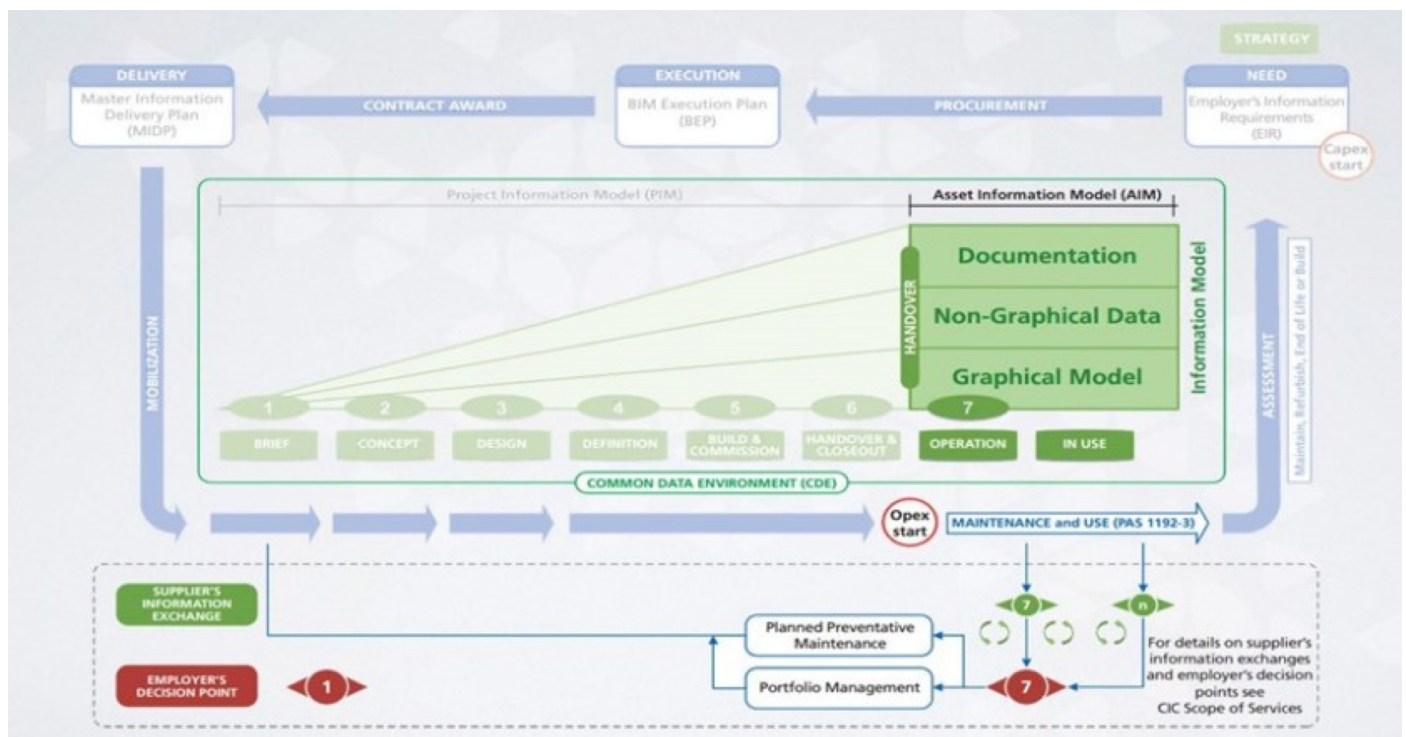
The second section ASSET INFORMATION MODEL (AIM):

It may be starting from here OPEX START if the building will be running in which we find the seventh stage.

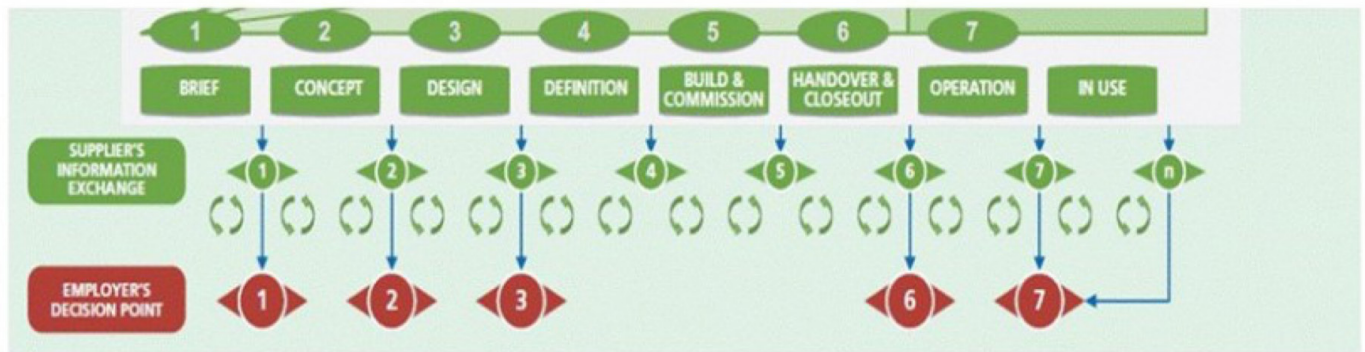
1.Operation and in use:

Comparing the project performance with owner's requirements; if they do not meet; unaccomplished elements should be identified to work on their fulfilments.

Let's start managing the building in operation no. seven. We should have sufficient information and model to handle the facility. For more details, you can revise the Construction Industry Council in the United Kingdom.



Below the Information delivery cycle, you can see:



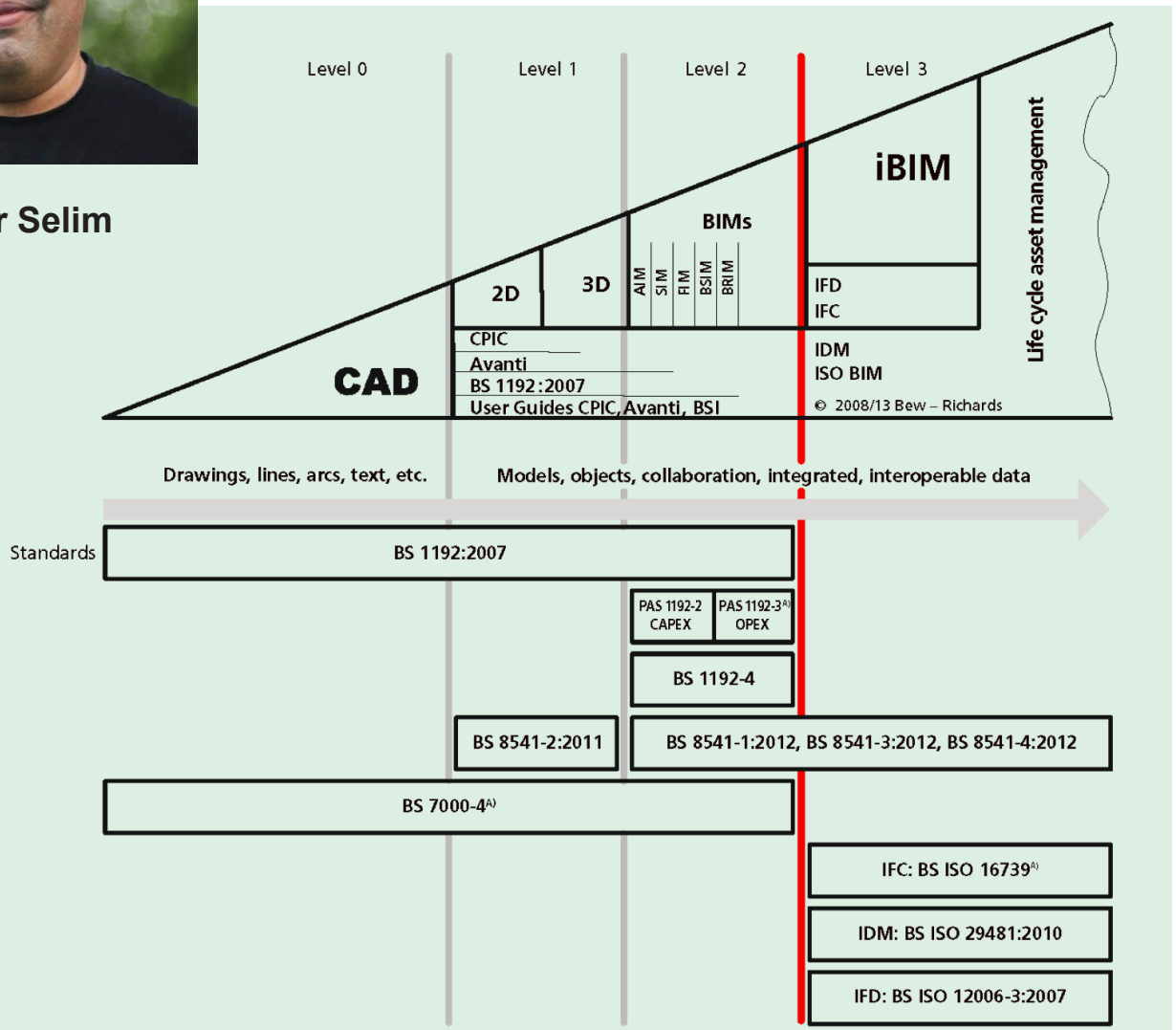
Green circles, which represent information exchange between:
SUPPLIER'S and INFORMATION EXCHANGE SUPPLIER

Moreover, Red circles, which represent the exchange of information among team members and discussions with the owner.
EMPLOYER'S DECISION POINT



Omar Selim

THE UK BIM MATURITY MODEL FORM PAS 1192-2-2013



Levels of The UK BIM Maturity Model or as it is often called the “BIM levels” or the “BIM wedge” and transfer from level to another:

Level 0, In level 0 we do not use BIM. You use a CAD tool to generate 2D CAD drawings use draw line, arc, text, etc. You can share those drawings electronically via email or paper drawings can be distributed for design coordination. In this level no collaboration.

Level 1, we progress from CAD to generate suites of 2D information, followed by non-federated 3D models, until now no collaboration. This may include 2D information and 3D information. Level 1 can be described as 'Lonely BIM' as models are not shared between project team members.

Level 2, sees the progression to building information models and the federation of those models between different parties in the project team. Federation takes place within a single shared online area known as a common data environment. In broad terms, Level 2 is defined as “file-based collaboration and library management” but we will take a closer look at what that actually means in a moment.

In the UK the Government Construction Strategy published in May 2011, stated that the '...Government will require fully collaborative 3D BIM (with all project and asset information, documentation and data being electronic) as a minimum by 2016'. This represents a minimum requirement for Level 2 BIM on centrally-procured public projects.

Example for models

- AIM Architectural information model.
- SIM Structural information model.
- BSIM Building services information model.
- FIM Facilities information model.
- BIM Bridge information model.

Levels 1 and 2 are supported by various guidance documents available online.

Level 3 imagine a wholly (BIM) integrated project information model, hosted and fully developed in a common data environment, by all members of the project team in real time. That model could then be passed to the Employer for use in lifecycle management as an "Asset Information Model."

Standards for interoperability:

- IFC Industry Foundation Classes
- IFD International Framework Dictionary
- IDM Information Delivery Manual

The move from Level 2 to Level 3 is a big step to take, which is acknowledged in the digital built strategy by defining four distinct delivery phase scales:

- Level 3A Enabling improvements in the Level 2 model;
- Level 3B Enabling new technologies and systems;
- Level 3C Enabling the development of new business models;
- Level 3D Capitalising on world leadership.

In the UK BIM interpretation of Level 3 there are three requirements

- There should be 3D BIM native files for all disciplines
- There should be 2D design documents generated from the BIM models
- There should be structured data about the building spaces and building equipment according to the COBie UK standard.

You can notice red line between second and third levels because the UK and the world want now to do the second level and until now no one has arrived at Level 2, but the UK plans to make level 3 mandatory at 2025.

THE ADVANTAGE OF BIM THROUGH GAME DRIVES AND VIRTUAL REALITY

In 1970 and the beginnings of modest, Video games appeared on different types of devices in various categories and companies was then competing to win and satisfy many of the lovers of this kind of hobbies.

Today, the video game industry has generated huge sums of money. In its 2013 report, the Entertainment Software Association reported that US video and computer game revenues alone exceeded \$ 21 billion. You might think that you missed the figure, but that is the case. Moreover, you will ask yourself what the relation between Video Games and BIM is?

Let's get back a little bit back with these golden opportunities and inventions that



Amar ElTom



have changed history as touch screens, motion sensors, voice control, enhanced graphics capabilities with special cards and increasingly sophisticated hardware and software. All these things have led to some waking in other areas, BIM as an engineering-based on this new technology is one of the industries that have benefited very favorably from such technological innovations.

For example, the different controllers that appeared in the series Nintendo Wii and Microsoft Kinect provided more training methods. Practical models (3D) can also enable shortly construction workers and engineers to navigate and freely and permanently update the BIM models more accurately and safely in field conditions, where there is no space and equipment and also the difficulty of using the mouse and keyboard.



BIM is a multilayered science that is slowly touching our lives. It is one of the unique techniques which serves the field of engineering efficiently and helps to detect errors and solve them before there is an adverse consequence, where the game engines can be combined to provide a project model and access to the method. Similar to those games that are used (Person Shooter Games).

Designers, customers, and stakeholders can explore models and projects in the same way from a human perspective by navigating the project even before it starts. This method has several benefits, including but not limited to:

1. Test areas of vision.
 2. Test access routes and escape routes (for civil defense licenses)
 3. Seeing and exploring the external and internal raw materials and finishes of the project
 4. See all problems that occur during modeling and conflict resolution processes.
 5. Real simulation of TIS.
 6. Project tests in terms of climate variability and impact.
- And many more countless feature.

Sim City is one of the most effective simulation based on the BIM concept. There is an integrated library of buildings and projects to create an entire city of services on the principle of drag and drop. With continuity, we will see the High cost of building the city according to the state and destination of the target areas. This is what makes the BIM (3D,4D,5D) Model, Time and Cost.





BIM is science that we should attach to and practice more widely and move away from the CAD world gradually. If we imagine, for example, that a general plan for a city or neighborhood Revit Residential With the

help of Autodesk Infrastructure, AutoCAD Civil 3D and Autodesk Infrawork360, imagine how the result will be if the technology is integrated with the navigation and motion control panel technology?

We will be able to roam within an integrated city before it even has a real presence on the



ground and also imagine the significant benefits that we will derive from this beautiful work and great. You can only imagine.

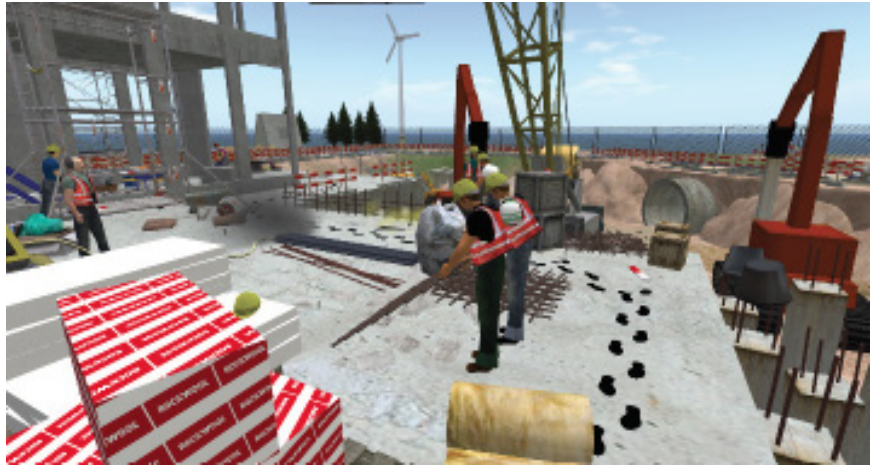
Also, one of the examples that used

the game is very naive (My Craft) where the user builds structures from a variety of different materials in the form of cubes such as clay, sandstone, wood and iron in addition to doors, stairs and railways.



Moreover, more examples such as the famous Grand Theft Auto.

What I want to get through these examples, is the importance of taking advantage of the advanced simulation engines in the field of BIM, as it adds a special life and style within the models designed in that way, where the engineering process is easy and easy to design and develop models built using this technology.



Richard Shennan, an experienced leader in the field of infrastructure in Mott MacDonald's group, said that "engineering has found it difficult in recent years to attract young people, but with these exciting techniques and devices will push this forward and will be a magnet for new faces, skills, and ways to think.

MAYA - 3D MAX - MOTIONBUILDER - STINGREY ENGINE - MUDBOX - SCALEFORM - NAVIGATION - BEAST.

Autodesk enters the battle with all its weight and full of weapons:

The world of animation and its connection to BIM is increasingly sophisticated and accelerating and has provided the world's largest software industry (Autodesk) that can be used to work with Revit to help you create innovative experiences that meet customer expectations such as:

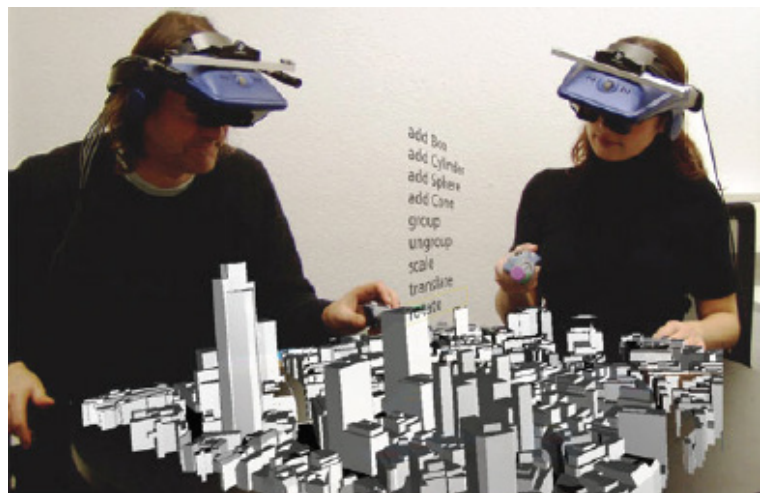
Autodesk has recently published articles on the trend over the coming period to combine BIM models with advanced visualization techniques and game engines to enable customers and professionals to experience new tools and create a perfect harmony in the engineering process.

Autodesk president Karl Bass said: "The game industry and its engines, in particular, have the real potential for BIM."

Also, said: "If we can work on a similar type and create an interactive environment using design tools, this will create a richer experience for designers,"

Many experiments have already begun. Namely a technique called Virtual Reality or VR, where it can see the two-dimensional projections, and printed on ordinary paper can be seen stereoscopic and three-dimensional full of architectural details and finishes as well as furniture and other.

When a man like Karl Bass says such words, what do you expect from Autodesk over the next period?



Finally, I will leave you to your imagination to think until we meet again in upcoming articles.

REVIT API

Introduction

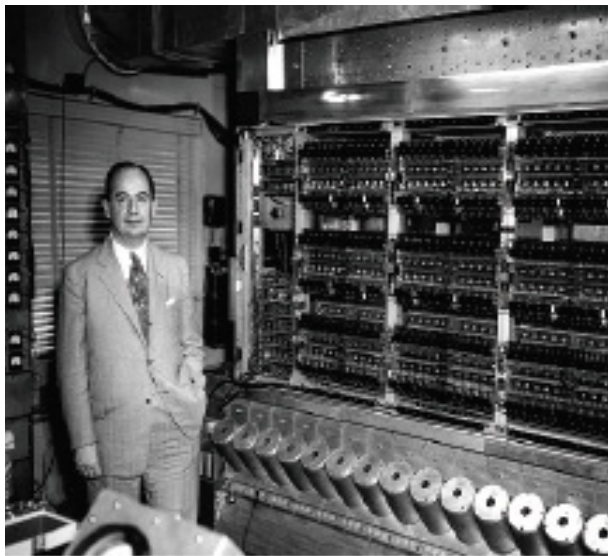
A lot of us heard about Revit API and what magic it can do. In this issue, we will have a small introduction to History of programming and the relation between programming and API. I would consider this issue, and future issues to be a personal resource, as I hope it will be for others, a diary? Can be assumed.



Mostafa Khalil

So what is the story?

So far the world is in an extreme increase of inter-connectivity, which demanded programming languages to set a solid foundation for the future. Did you know that the first programming language is over 100 years old and was written by a woman, Ada Lovelace? In addition to outlining the history of languages and how each is traditionally used, Computers have a huge impact on our life, and computer programs tell those computers what to do and how to do it. It is to admit that computer programs



have altered our existence. So, it is about time to learn something about them.

Originally, first mechanical computer, created by Charles Babbage in 1822. The idea of inventing the computer was following the magnitude of information and the development of writing on paper, as a way to provide a significant time saving for the four arithmetic operations. Ultimately, the binary language is what the machine can understand, and its total letter count is 2 (0,1) equivalent to human language (Yes or NO).

Did you know that the programming idea came from a loom machine?

0,1 was extremely hard to human to read the thing that it was required to interpret this language to a human readable language. That was the start where the assembly language was invented on the 1940s. It was probably the first (vaguely) human-readable programming language, but by the 1950s computer engineers realized that assembly language was far too laborious and error-prone to build entire systems out of — and thus in 1955 the first modern programming language was born: FORTRAN (FORMula TRANslator). LISP (LIST Processor), ALGOL (ALGOrithmic Language), and COBOL (Common Business Oriented Language) would follow in the next few years — and as they say, the rest is history. Almost every language today is derived from one of these first four languages — and indeed, FORTRAN, LISP, and COBOL are still actively used by large, lumbering institutions like the National Weather Service and the US Postal Service, and nevertheless, Autocad add-in is using LISP.

By the time of assembly invention, IBM was the leading Company. IBM created its first operating system (OS). Operating System is a software system that manages computer hardware and software resources and provides common services for computer programs. The operating system is a component of the software system in a computer system. Application programs usually require an operating system to function.

As computer fans are increasing Tim Paterson has created a smarter OS named as DOS (Disk Operating System). So far IBM has seen this program and decided to adopt it. For some time, it has been widely acknowledged that DOS is insufficient for modern computer applications. Microsoft Windows helped alleviate some problems, but still, it sat on the top of DOS and relied on DOS for many services. Even Windows 95 sat on the top of DOS. Newer operating systems, such as Windows NT and OS/2 Warp, do not rely on DOS to the same extent, although they can execute DOS-based programs.

By Experience, we realized that all programs write the same Method (sequence of code instructions) where it becomes a time consuming to write the same code for the same task for a different application. This lead to the invention of the Dynamic Link Library (DLL).

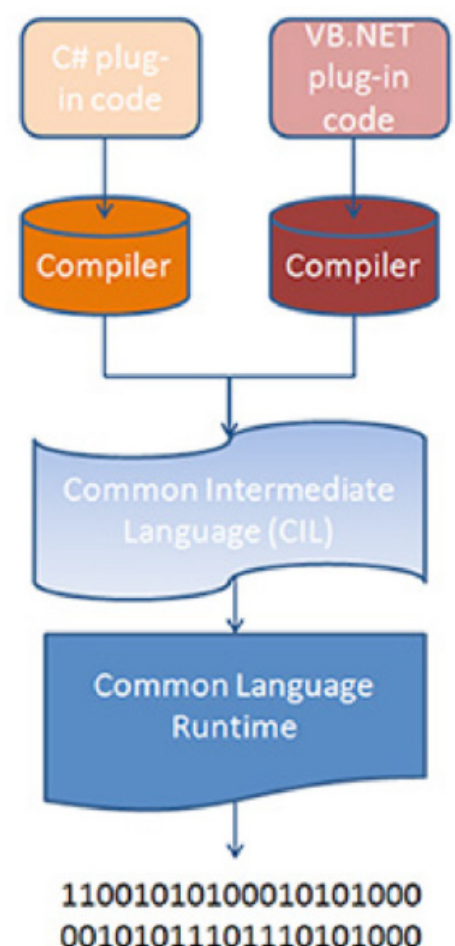
More languages have been invented which led to a growing gap between programmers and communication languages standards. You can think of it like we are in the same country and each one of us has decided to communicate with each other by his language standards. This will lead to a significant failure of development, that was the reason behind inventing OOP (Object-oriented programming)

“Object-oriented programming (OOP) is a programming language model organized around objects rather than "actions" and data rather than logic. Historically, a program has been viewed as a logical procedure that takes input data, processes it, and produces output data.”

In general meaning to the above statement from Wikipedia, speak the language you like, but you will never have a different grammar. This is why you can now program any ".NET" application such as Revit.

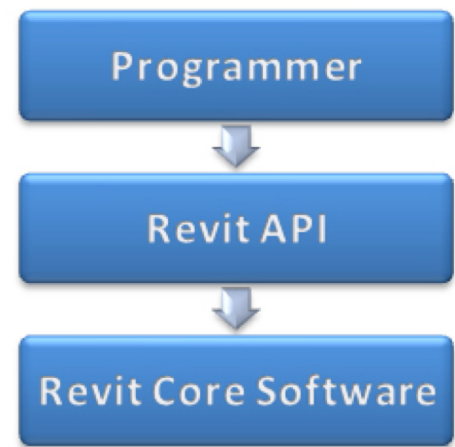
So what is the relation between Programming and Revit API?

Let's first identify API. API is an abbreviation of "Application Programming Interface," which means, instead of using Graphical user interface (Button, slider, mouse...etc) to input codes and request the computer to follow. So in another meaning, it is a list of instructions to the application to follow to perform a special task.



Does that mean I can do anything with Revit API? Actually NO. It only allows programmers to do proper integration within a limited allowance boundary. Explaining that we need to understand how the communication works between Programmer and Revit.

Like mentioned before all machines understand binary (0,1) and languages have been interpreted to allow individuals to write instructions to the computer (application). Ideally, the sequence starts from a programmer who writes code (a list of instructions) to Revit Core-SoftWare. These list of instructions are compiled and generated to an intermediate language so Revit can understand, and that is the DLL you created or downloaded from Autodesk Exchange App. When you start running Revit, Revit opens a channel to the machine and read your instructions from the DLL you provided turning it to a common language where the machine starts complying your instructions. That is only done at Runtime.



However, if like I said does writing instructions to Revit can do everything? Again NO, Autodesk has allowed API technology as a part to interfere with its Products under limits and boundaries. For example, you can through API create walls, but you can not create ceilings (till version 2016). So a briefed short explanation API is programming interface to the core boundary of Revit.

I would like to mention that you can drop me an email seeking information or answers and if the email body is considered valuable to publish we will publish it with the answer.

Happy to share some useful sites.

Learning C#

<http://www.csharp-station.com/>

<http://www.microsoftvirtualacademy.com/training-topics/c-app-development#?fbid=Q3dsLtYd9BS>

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

RevitAPI

<http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=16777469>

<http://boostyourbim.wordpress.com/>

<http://thebuildingcoder.typepad.com/blog/2013/04/getting-started-with-the-revit-api.html>

BIM IN ARABIC COUNTRIES

Dubai Municipality released a circular updating its mandate regarding the usage of building information modeling (BIM) systems across construction projects in the Emirate, Construction Week can reveal.

Circular (207) is titled 'Regarding the expansion of applying the (BIM) on buildings and facilities in the emirate of Dubai,' and has been referenced 812/02/02/1/1509774.

The circular is dated 23 July 2015, states Dubai Municipality's intent to "expand the usage of it (BIM)."

According to the circular, Dubai Municipality's BIM mandate from 2013, issued through circular (196), has been succeeded by circular (207), as part of the civil body's efforts "to follow up on the latest construction trends from all over the world, for all the benefits that come with all the parts involved in this, from project owners to consulting firms and contractors and government departments."

BIM is being encouraged "because of how much it lowers the cost of construction projects and the time taken to finish them, and increases the level of coordination between the engineers working on designing and implementing the project, and their counterparts in the management and funding and manufacturing the project."



Dubai Municipality's 2013 mandate – circular (196) – pertained to the application of "The first stage of BIM in the construction and mechanical (parts) on buildings and the following facilities:

- Buildings which are above 40 floors.
 - Building with area's larger than 300 thousand square feet.
 - Specialised buildings such as hospitals, universities, and all that is similar to that.
- All buildings requested on behalf of a foreign office."

First – Architectural and mechanical works for the following buildings:

- Buildings that are above 20 floors.
- Buildings and facilities and compounds with areas larger than 200 thousand square foot.
- Buildings and special facilities like hospitals and universities and all that is similar to that.
- All governmental projects.

All buildings and projects that are requested from a foreign office."

The circular continues, adding the requirements of its previous circular, would continue to stay in effect:

"Second – For buildings and projects that were mentioned in the previous circular announcement, which is the number (196) in the year 2013 (already mentioned above and they are):

- Buildings that are above 40 floors.
- Building with area's larger than 300 thousand square feet.
- Specialized buildings such as hospitals, universities, and all that is similar to that.
- All buildings requested on behalf of a foreign office.

Moreover, this is starting from 1/6/2015 (1 June 2015), and that the consulting and advisory offices are legally questionable and responsible on applying this."

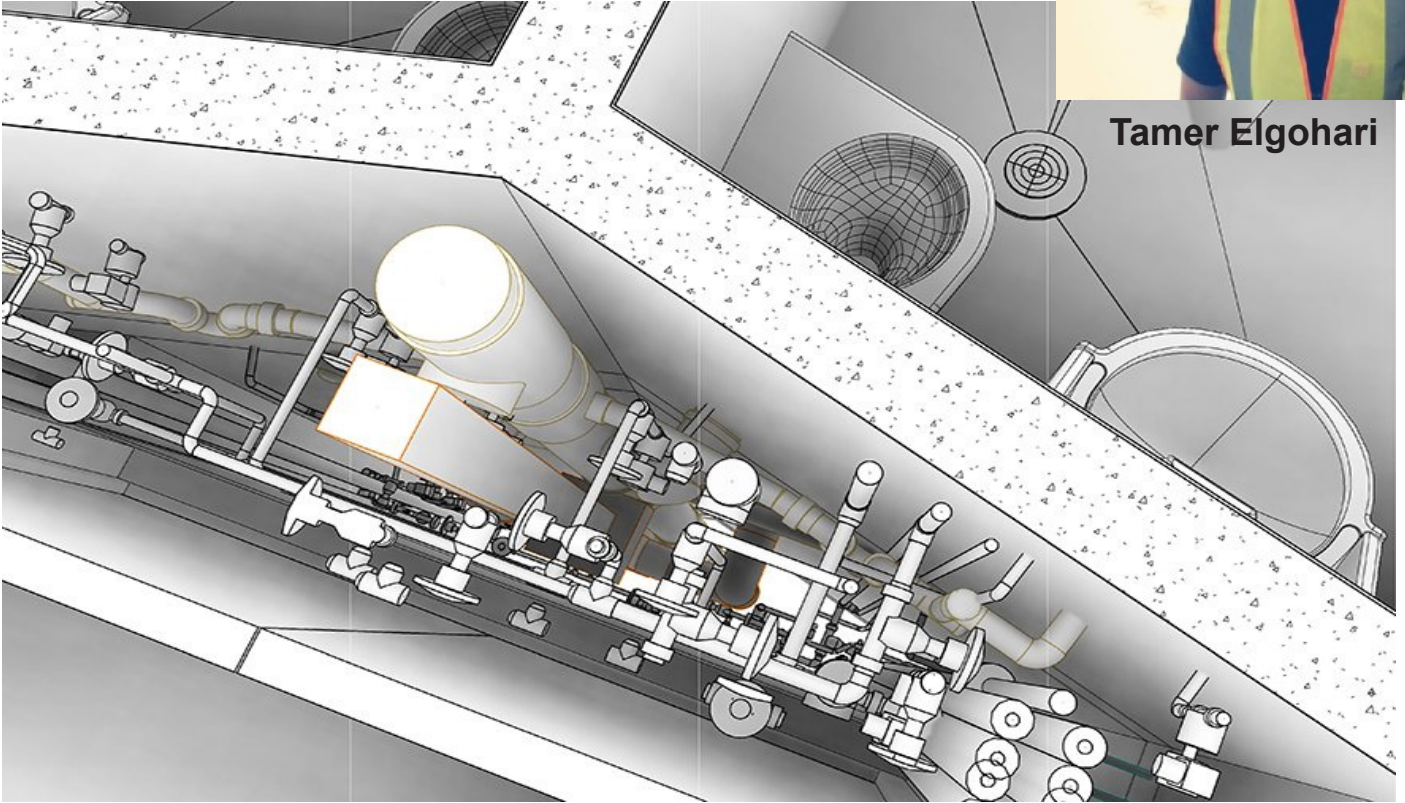
The circular, signed by Engineer Khalid Mohammed Saleh, director of buildings department at the Municipality, concludes saying the organization is "hoping that all such offices would coordinate and work with what is mentioned above."



GENERAL COMPARISON BETWEEN BIM 4D SOFTWARES



Tamer Elgohari



The 4D BIM modeling is the next generation of project management including project planning, scheduling, and data analytic. The 4D adds vision to the construction team also it integrates the ability to visualize your project and analyze dynamic spatial data on your computer before you break ground creates a practice field for the delivery team that is highly engaging and efficient.

However, the question here “Which 4D BIM software do we have to adopt?” This issue has been struggling all over the BIM discussions, and the answer is hard especially for AEC companies that are new to the BIM technology.

So, I have prepared this paper based on many BIM expert's reviews to answer that question and I will compare between the most common 4D simulation software in the market: Navisworks - Synchro - Bentley Navigator - ITwo - Vico Control:

Attribute	Score out of 5					Comments
	Navisworks	Synchro Professional	Navigator	ITwo	Vico Control	
Ease of learning	2.5	3.5	2.5	3	2	<ul style="list-style-type: none"> Synchro appeared a lot easier to pick up and has a relatively simple user interface, also programme input is more advanced because it allows the user to input more complex programmes which include discrete functions such as "start as late as possible", delays, float etc – it also allows the user to compute the critical path. In all packages, it is simple to link elements from a 3d model to an activity/moment in time. Interoperability between Revit and Navisworks is really good, as both are Autodesk products. All the data from the BIM model is available in Navisworks and ready to be utilized for sophisticated purpose. Further, the 'switchback' and synchronization options offered work very well with the tested workflow.

Extent of 4D features (scheduling , project Analysis, conflict detection and what if scenarios)	3.5	4.5	2.5	2.5	3	<ul style="list-style-type: none"> • Synchro –software focuses on 4D programming and is very effective and can be done easily and intuitively as a planner for both simple and complex project operations, Costs/material/equipment/and location resources can also be associated with activities and reported accordingly. • Navisworks , Navigator and Itwo does not allow the user to enter new tasks or complex discrete functions for programmes, although this is not necessary for producing presentation animations as the programme can often be “fudged” as required to show the idea of the project but not support management functions. Navisworks is fine for marketing ideas. • Vico 4D system that uses line of balance method which is a special unique methodology that has no industrial following or foundation of support from academia or industry. • It should be noted that both Navisworks and Synchro has additional functionality aside from animation that could find value in large building projects such as 3D clash detection, Synchro alone has 4D clash detection, real-time mark-ups, rendering, and the ability to cut a cross-section in the model at any point in time.
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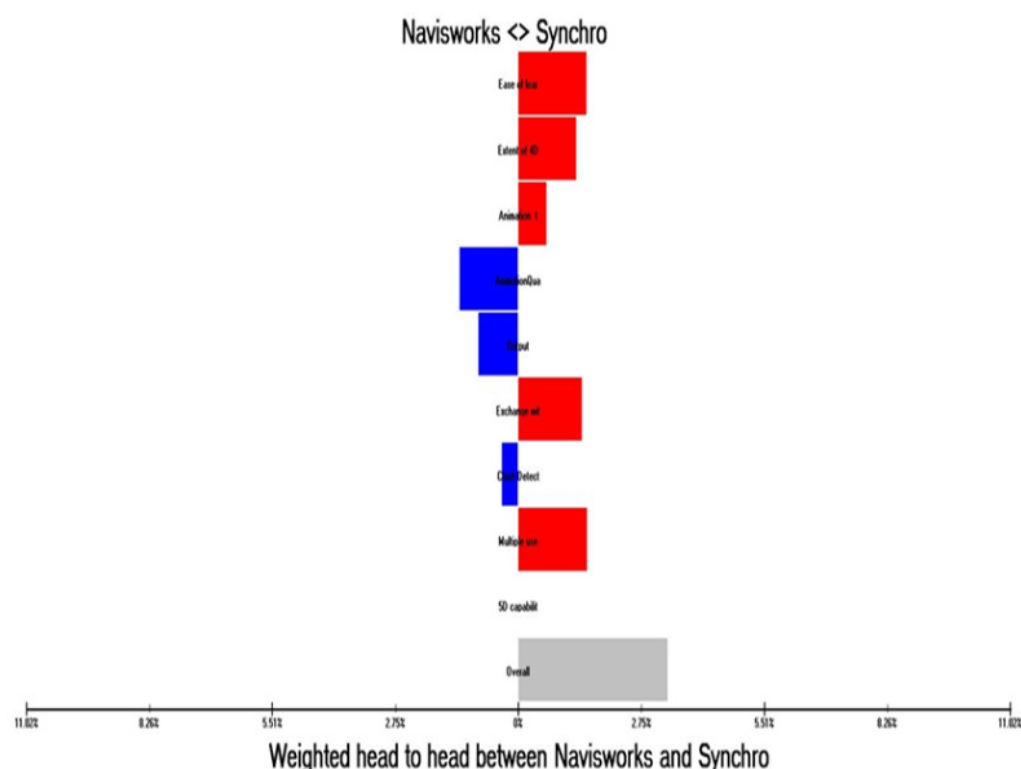
Animation time	2.5	3.5	2.5	2.5	2.5	<ul style="list-style-type: none"> • Synchro is a lot easier to produce a simple animation and is less labour intensive. • Navisworks can produce more elegant animations, but it requires much more labour and is not intuitive. • Vico, Navigator and Itwo animation is a bit frustrating and unnecessarily iterative given the objective.
Animation Quality	4	3.5	2.5	2.5	3	
Import And Export (File format, File Size, Snapshots and videos)	4	4	4	4	3.5	<ul style="list-style-type: none"> • All software packages can export animations in a variety of AVI movie file formats and compression methods. "Still" images can be output from any view at any time. • Synchro has many reporting functions for project planning and scheduling that are missing in the rest. • Navisworks, Navigator, itwo and Vico has strong design review functions while Synchro is for project scheduling and project management functions using 4D features.
Exchange with p6 and Auto linking	3	4.5	2.5	3	2.5	<ul style="list-style-type: none"> • Navisworks does not integrate with full round trip data exchange with p6. • Synchro integrates with full round trip data exchange with p6 • Vico, Navigator and Itwo does not integrate with full round trip data exchange with p6.
Clash Detection rules	4	2	4	4	2	
Multiple users	1	5	1	1	4	
5D & QTO capabilities	3	3	1	5	4	

Software	BIM Key Feature
Navisworks	<ul style="list-style-type: none"> • Point/Line Based Clashing • Track status of clashes as they are found and resolved • Export Reports • XML import/export • 4D Simulation • Schedule linking from other project management software • Set up planned and actual times to visualize deviations from the project schedule • Export 4D simulations into a prerecorded .AVI animation • Create project presentations • Rendering capability
Synchro	<ul style="list-style-type: none"> • "What if" scenario with side by side comparative Analysis. • Resource management • Multiple baselines capability to compare actual performance against planned • Progress tracking • Rescheduling options • Critical path planning and analysis • Synchronization with MS Project and Primavera • Ability to update the model • Mark Up and Annotate • E-mail tools • Earn value analysis reports • Resource and task usage reports • Line of balance view
Navigator	<ul style="list-style-type: none"> • Design Review and manipulation • Photorealistic visualization • Schedule simulation • Clash detection • Export Reports • Interoperability: IFC, DGN, DWG, DXF, SKP, PDF, IGES, STEP, etc • History tracking • Database repository

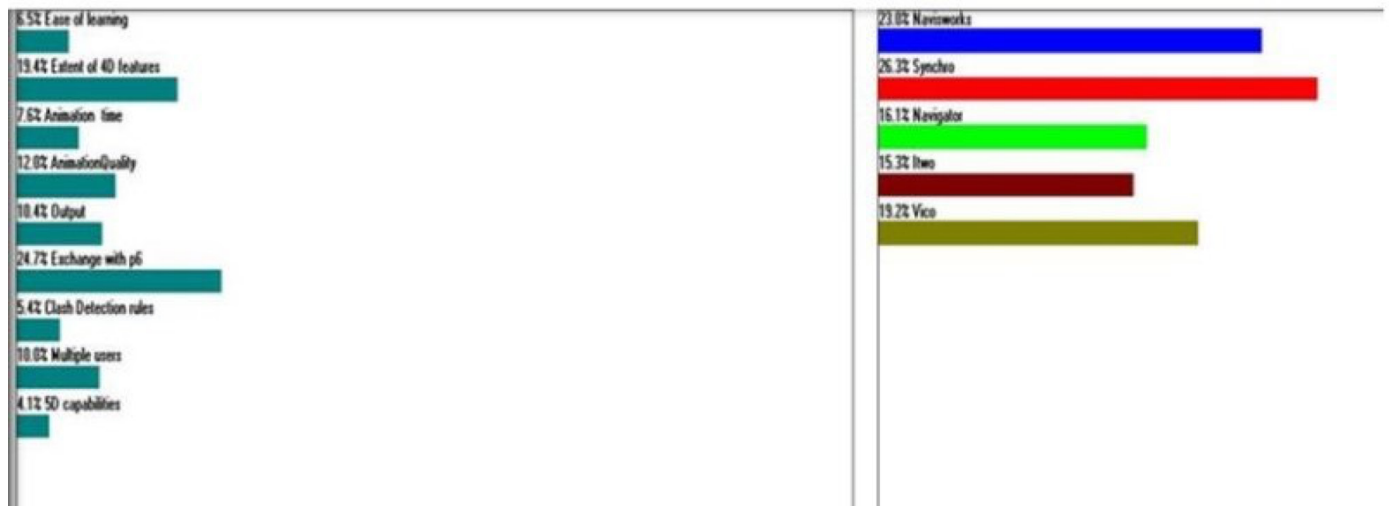
<p>Itwo</p>	<ul style="list-style-type: none"> • 5D End-to-End Platform • Combine Models from Multiple Sources • 2D Takeoff Integration • Schedule Integration Process. • Finance Integration • Create Organization Cost Code Standards • Reconcile with Finance in Real-Time • Utilize Finance Connectors • Mobile Field Data Collection • Collaborate with Project Stakeholders
<p>Vico</p>	<ul style="list-style-type: none"> • Ability to input schedule in Gantt or linear format • Location breakdown structure • Ability to create quantity based schedules to see bill of quantities • Resource histogram • Control chart color coding • Schedule forecast according to real progress inputs • Link multiple projects • Monte Carlo Risk analysis simulation • Prerequisites check capability (For the procurement) • Cost and cash flow capability • Look ahead reporting capability • Integration with MS Project and Primavera

Conclusion:

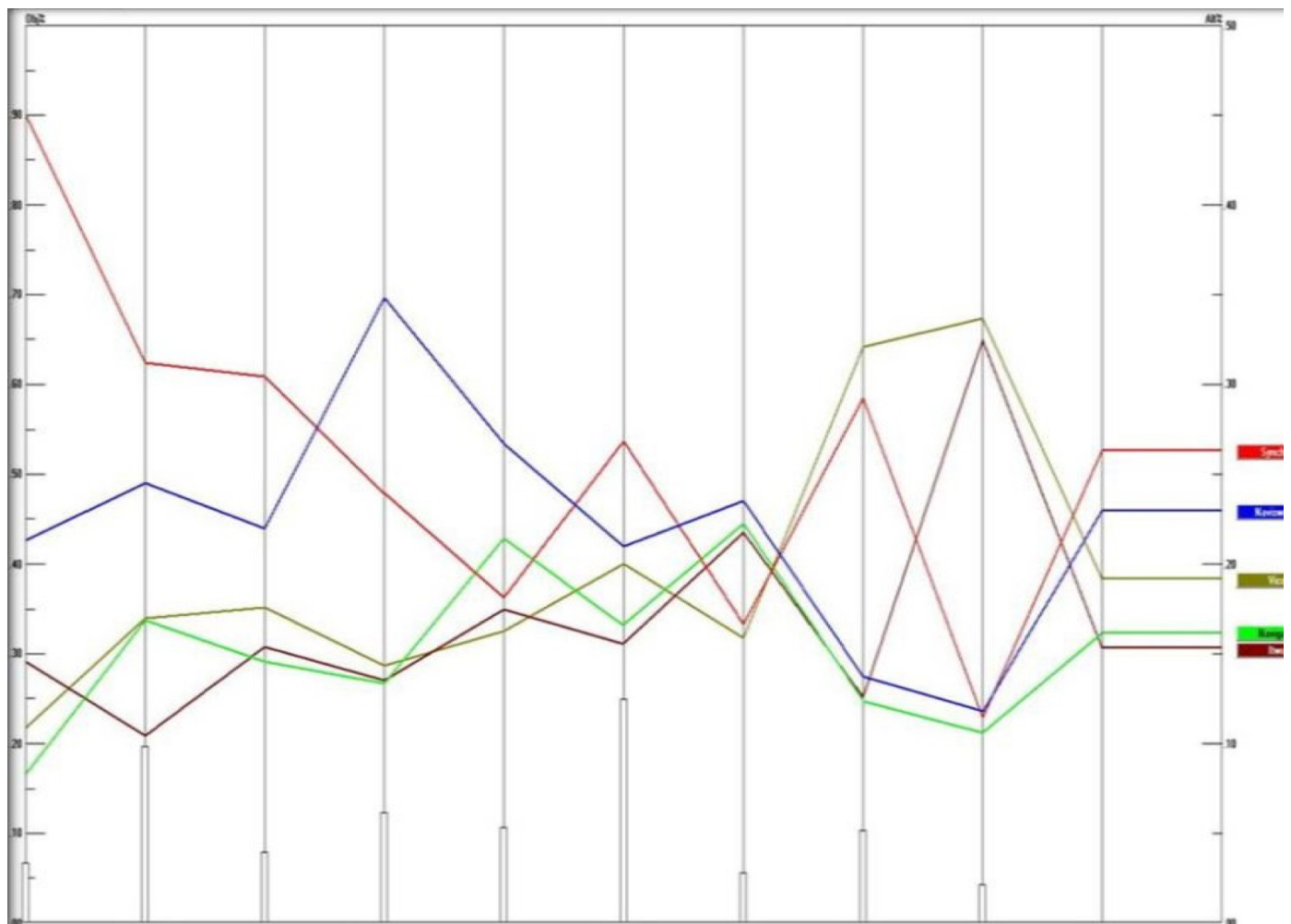
1.Head to head Analysis:



2.Dynamic Analysis :



3.Performance Analysis:



As result, I believe that:

1- Synchro is the most powerful tool in the market for the 4D simulation and schedule analysis but with good rendering output, visual clash detection only and fair EVA capabilities.

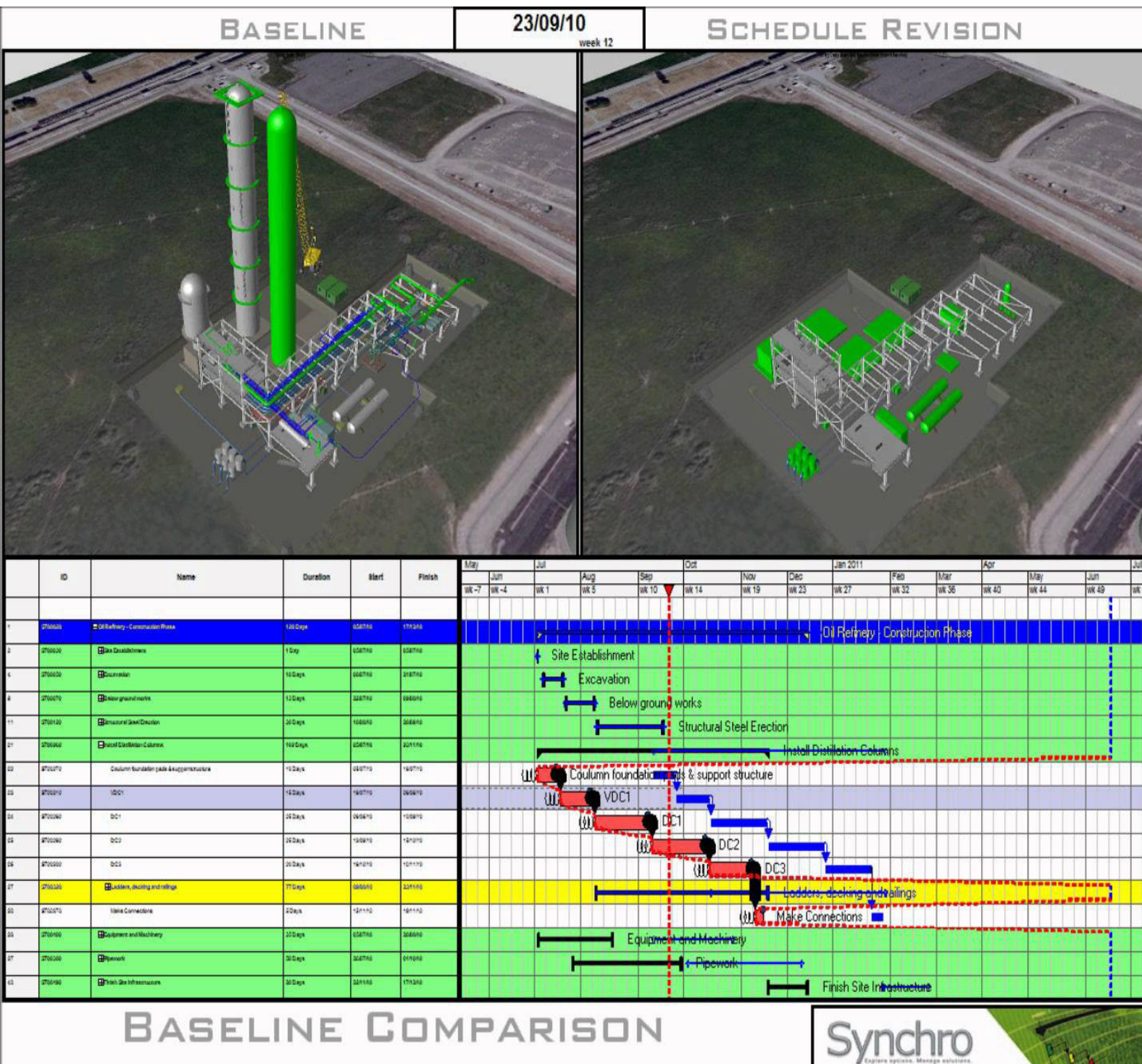
2- Navisworks is Powerful in Quantity take-off and clash detection with good 4D capabilities and sound rendering output.

3- Vico is recommended for projects with repeated activities (for example pipe laying activities), since it depends on flow line techniques based on location.

4- Navigator is Powerful in Quantity take-off and clash detection with poor 4D simulation capabilities and poor rendering output.

5- ITwo is very powerful in 5D simulation and quantity take-off with low 4D simulation capabilities and good clash detection reports.

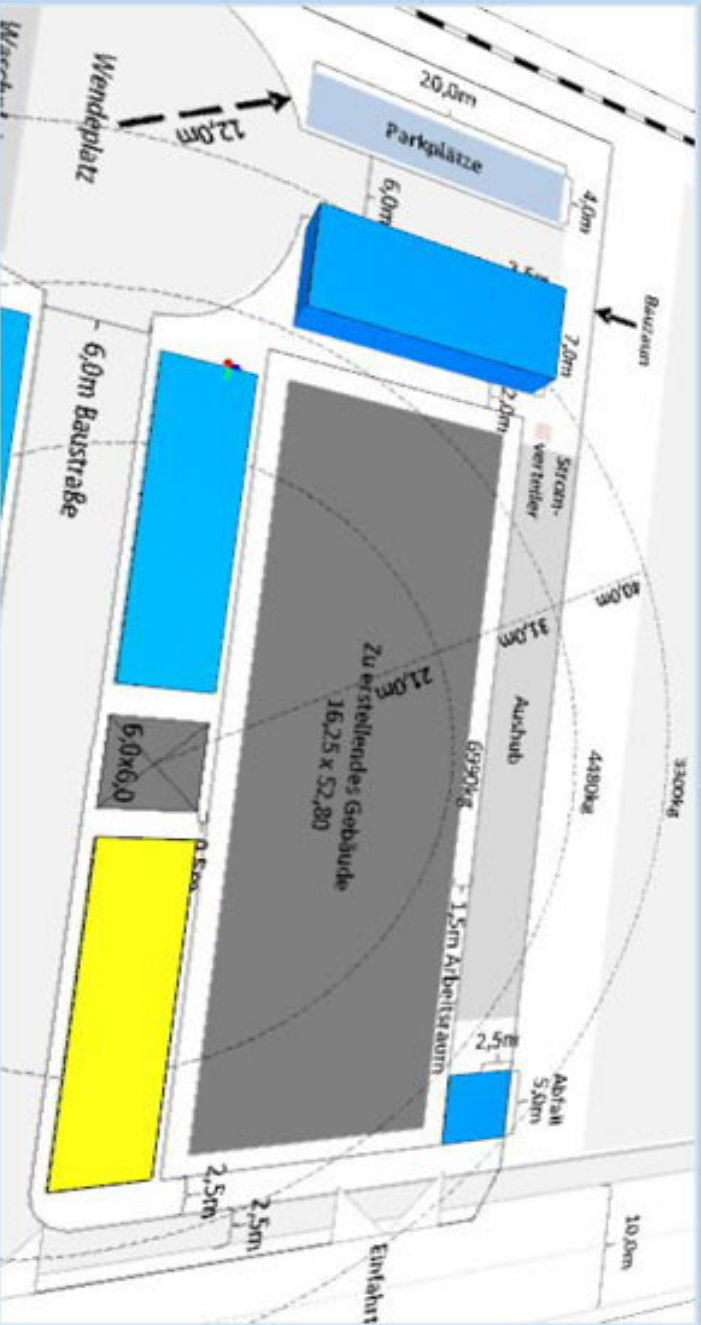
In my opinion, the best powerful 4D software, is the one that will satisfy your 4D integration needs.



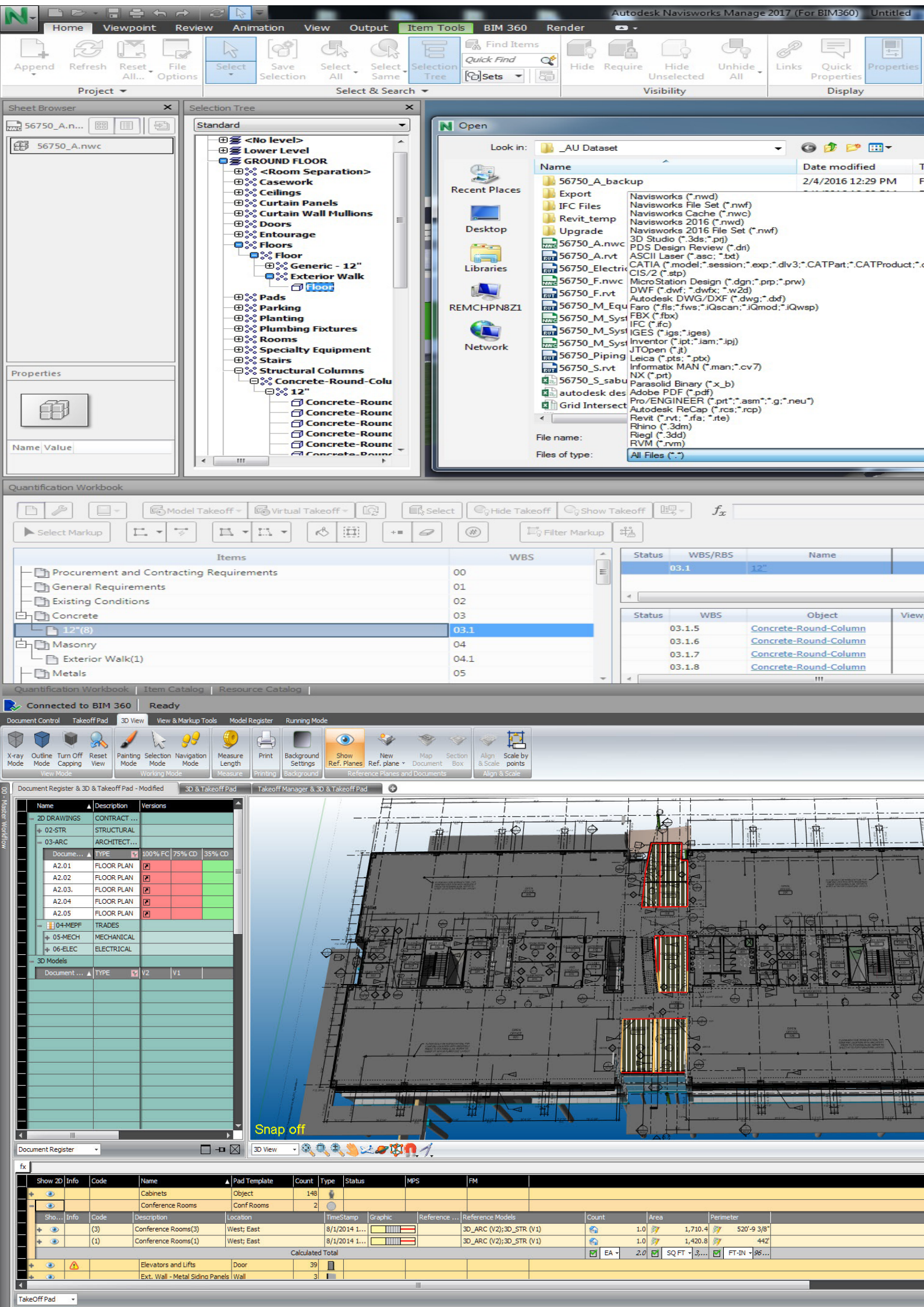
Struktur	Schlüssel	Bezeichnung	Menge	ME
1	1.10	Rotbau		
1.10	1.10	Wände		
1.10.10	1.10.10	Mauerwerksarbeiten		
1.10.10.10	1.10.10.10	HLZ 12/14 - MG II, d= 11,5 cm	449,157	m2
1.10.10.20	1.10.10.20	HLZ 12/14 - MG II, d= 24,0 cm	139,006	m3
1.10.20	1.10.20	Stahlbetonarbeiten		
1.10.20.10	1.10.20.10	Stahlbetonwände C25/30, bis 20 cm,	22,140	m3
1.10.20.20	1.10.20.20	Stahlbetonwände C25/30, d=21-30 cm	472,142	m3
1.10.20.50	1.10.20.50	Stahlbetonwände C30/37, bis 20 cm,	0,000	m3
1.10.20.60	1.10.20.60	Stahlbetonwände C30/37, d=21-30 cm	0,000	m3
1.10.20.61	1.10.20.61	Schalung Wände bis 20 cm, glatt	224,280	m2
1.10.20.62	1.10.20.62	Betonstahl IV S (500/550)	49,430	t
1.20	1.20	Festgrade		
1.30	1.30	Decken		
2	2	Ausbau		
3	3	Baustelleneinrichtung		
3.10	3.10	Parkplätze	79,720	
3.20	3.20	Baustraße	931,045	
3.30	3.30	Lagerflächen	1.171,669	

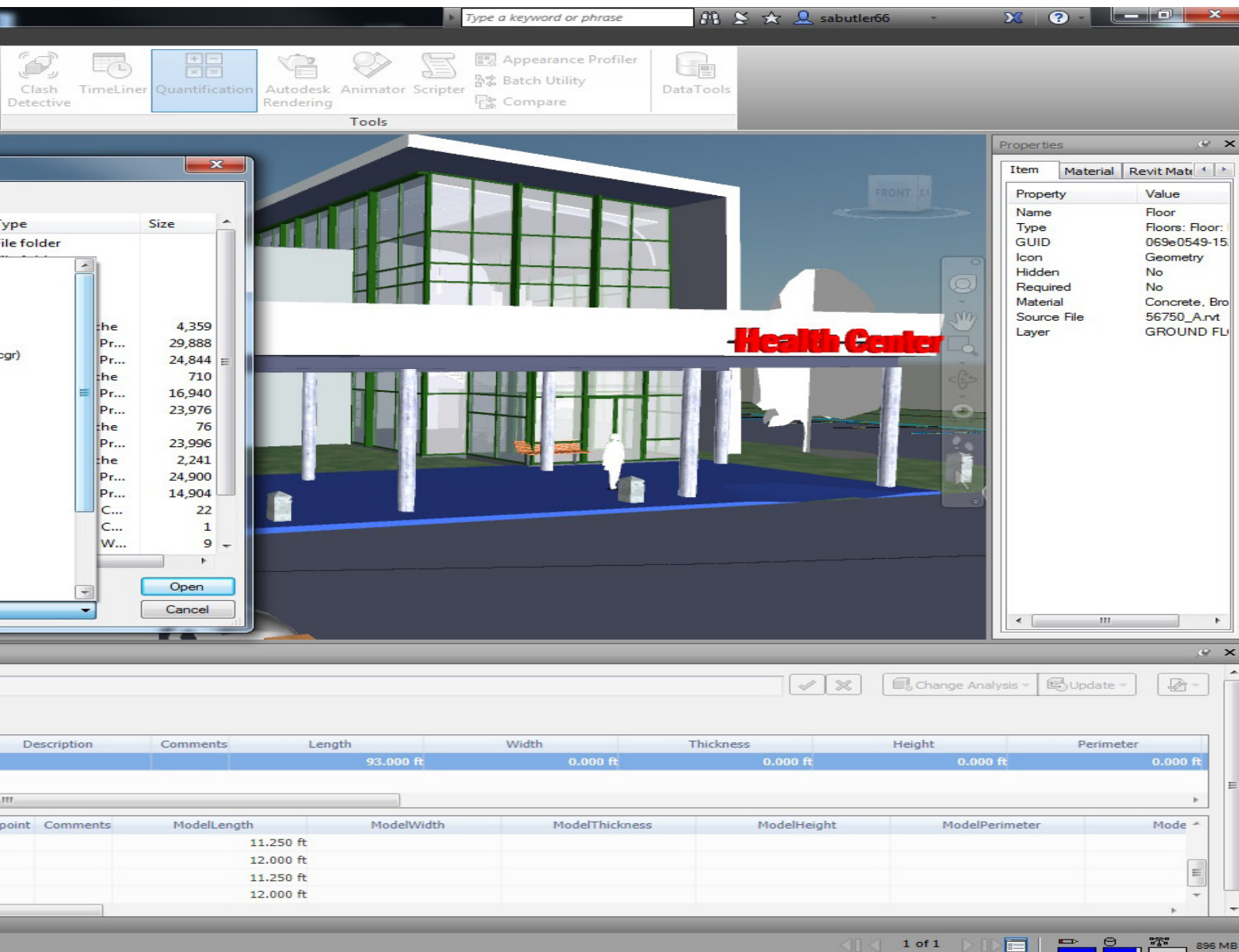
Variable	Mengeneinsatz	Länge	Breite	Höhe	Fläche	Stück	Wert	ME	Objekt	Instanz-Herkunft
3	128,084			3	128,084		384,252		BE Baustelleneinrichtung	2D-Mengen
131,832					131,832		131,832		BE Baustelleneinrichtung	2D-Mengen
199,800					199,800		199,800		BE Baustelleneinrichtung	2D-Mengen
149,680					149,680		149,680		BE Baustelleneinrichtung	2D-Mengen
149,854					149,854		149,854		BE Baustelleneinrichtung	2D-Mengen
130,865					130,865		130,865		BE Baustelleneinrichtung	2D-Mengen
25,386					25,386		25,386		BE Baustelleneinrichtung	2D-Mengen

Objekt-Visualisierung

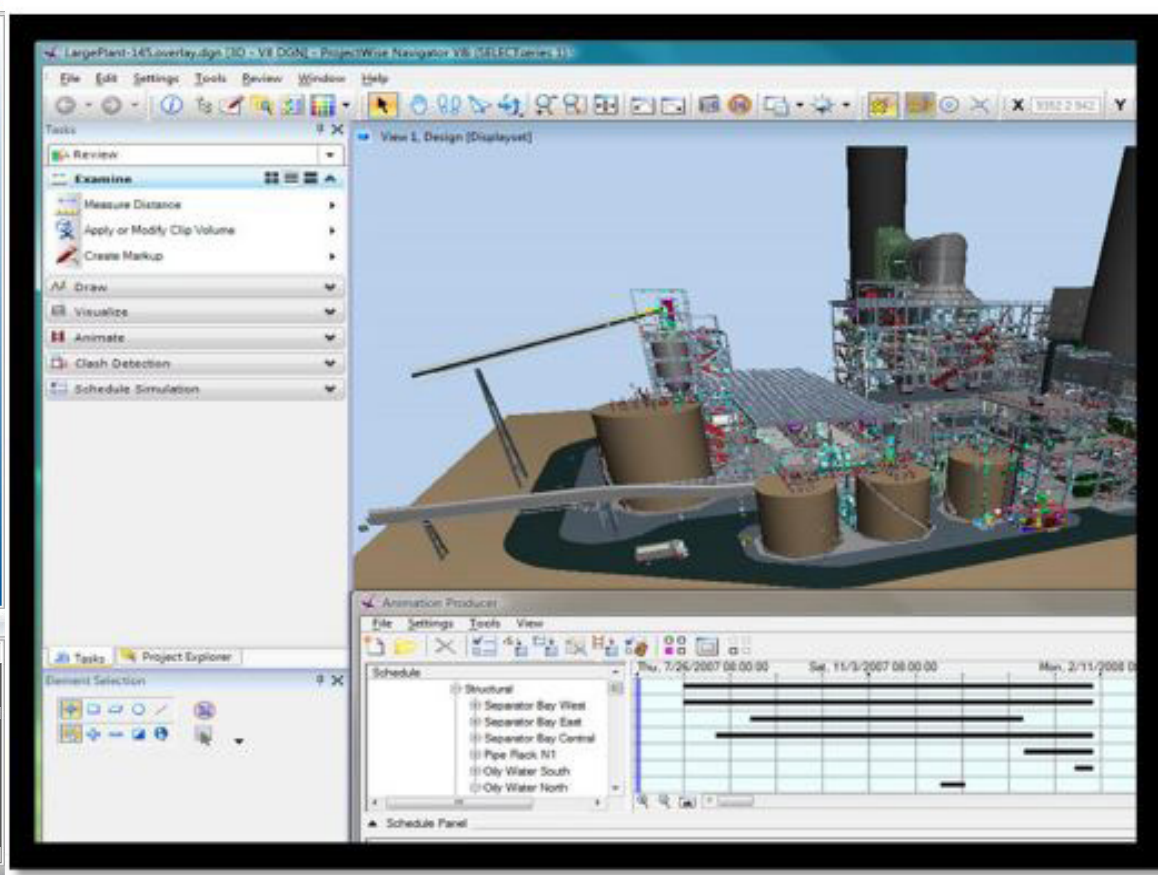
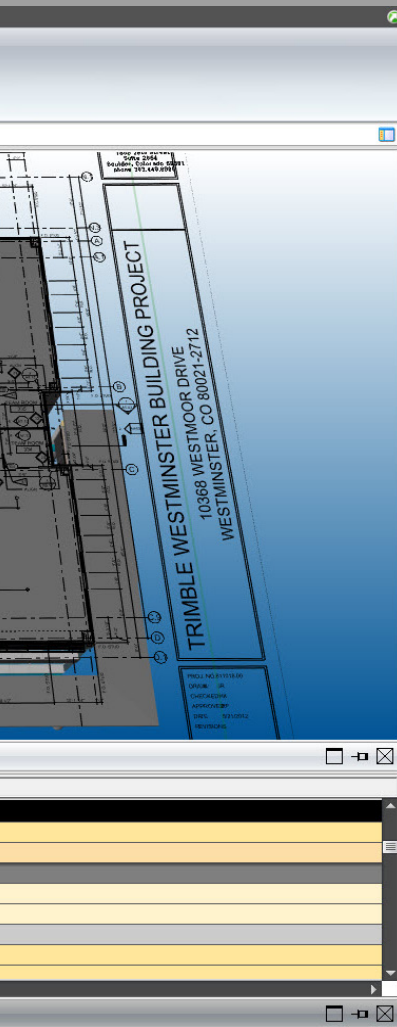


Objekt-Visualisierung Vorschau Messung

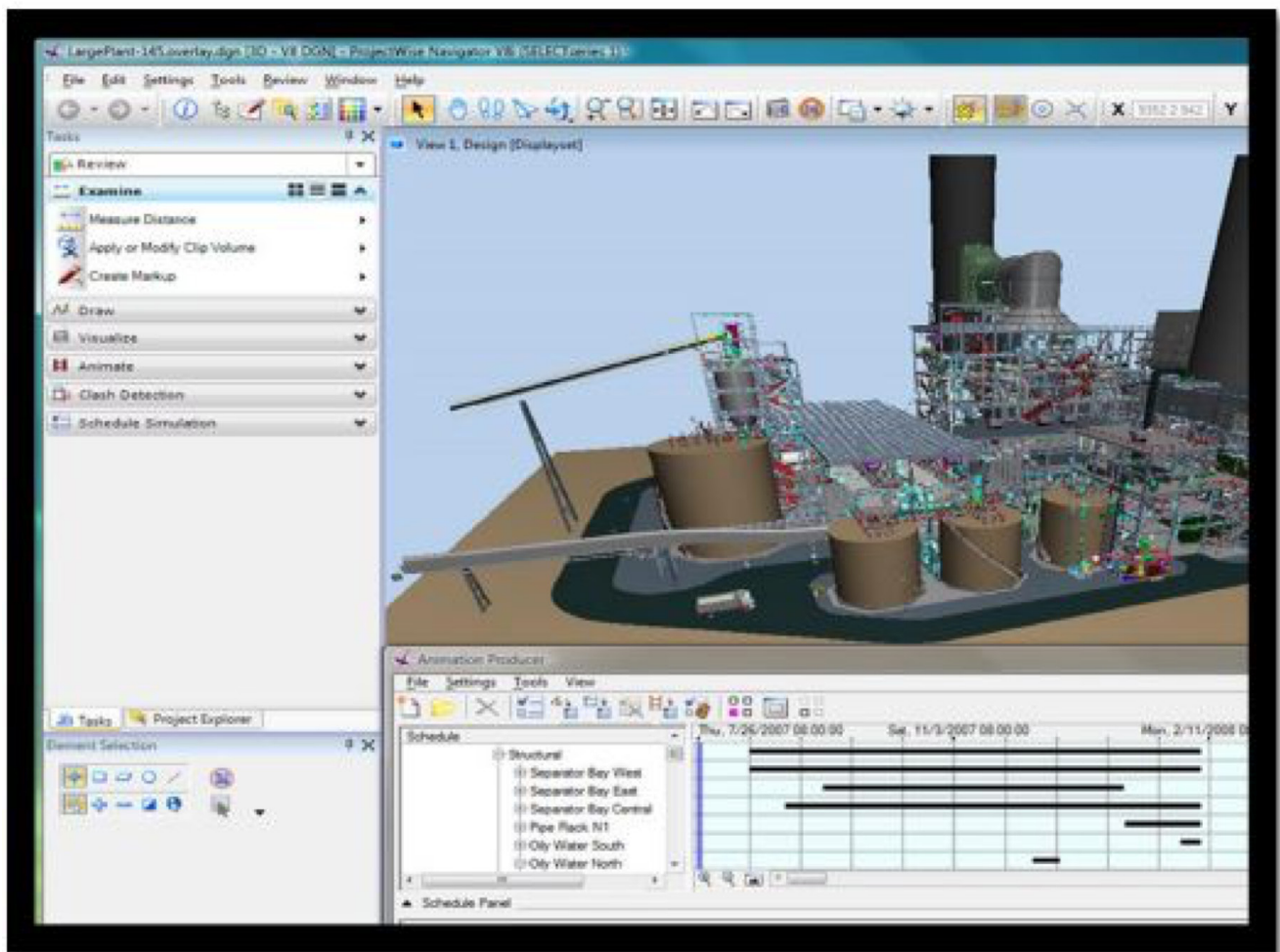




Navigator



Navigator



INTEGRATED PROJECT DELIVERY (IPD)

BIM technology is considered as the technological part of Integrated Projects Delivery (IPD). Although IPD has appeared a long time ago, BIM technology supported it to become easier. After merging these two concepts together, the new management concepts have moved to a new model that was not existed before to formulate a feature of this century.

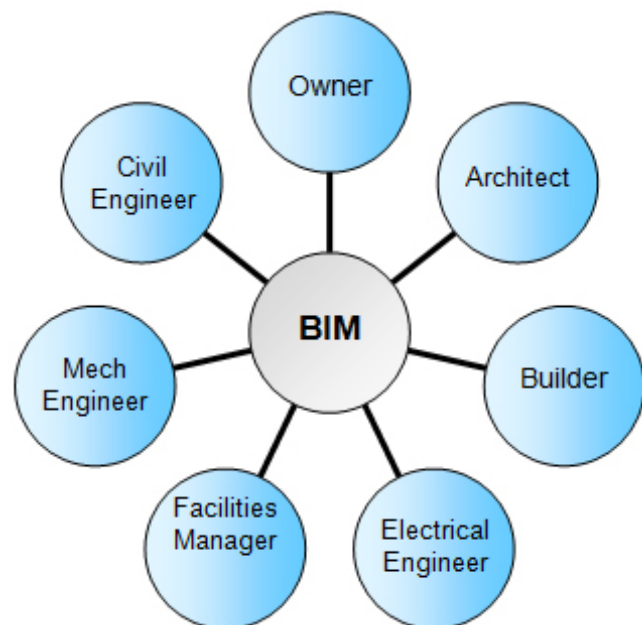


Samer El Siary

It is vital to anyone who learns BIM to understand the integrated project delivery, so learning BIM will not be an advanced AutoCAD which is the common mistake for the most of the engineers who are learning BIM.

The remaining question: What is the Integrated Project Delivery (IPD)?

The traditional project delivery method for construction projects follows a waterfall model where the design consultant creates the model and improve it to reach the execution phase. Posteriorly, the client launches the tender to select general contractors and subcontractors. A consultant will supervise while the owner will finance until the contractor handling the final delivery where the process of Building Facility Management is beginning.



You can imagine discovering errors in the design or change order by the owner during any stage of the project execution, which will delay the project. This is the type of the traditional problems that any engineer involved in project implementation knows them very well.

With BIM technology, this situation has been changed to keep pace with the digital engineering and project management technology to defragmentation between the project working team (consultant, contractor, and owner). Therefore, we find different definitions of integrated project delivery (IPD). American Institute of Architects (AIA) defined it as "a practical method to execute projects so that elements of individuals, technological systems, and business administration - as an ecosystems - will work together in order to get benefit of all specialized team knowledge, skills, and capabilities to execute all phases of the project from the first moment of designing." This method

takes place to reduce the wasted time in ongoing modifications, reduce errors and increase the efficiency of projects execution from the design phase to the execution phase.

Integrated Project Delivery should include these important points:

- 1-Engagement of the owner, consultants, and contractor since the early stage of the project.
- 2-Studying and standardize investment objectives, knowing the potential profits and loss to predict the return on investment.
- 3-The cooperation between the owner and contractors and the consultants in responsible.
- 4-Formulate a contract comprises the design and construction firms with the owner. This is a new type of contracts different from the traditional one, and there are many models proposed by various entities to facilitate this subject.
- 5-The responsibility will be shared between the owner, the consultant, and contractor in the design and execution phases.

To divide the process of Integrated Project Delivery to simple, practical steps in a logical order, those who want to carry out the IPD must do these eight stages in order:

- 1-Developing of architecture plan and design goals.
- 2-Having an initial project visualization and study the design concept.
- 3-Establishing detailed design.
- 4-Development the project execution drawings.
- 5-Getting the approvals and permits from official authorities.
- 6-Tendering and develop comparison terms.
- 7-Execution phase.
- 8-Initial Handing over and final delivery.
- 9-Facility management after execution.

For anyone studying the BIM stages, it is easy to link all previous stages to the seven BIM dimensions. He/she can feed BIM application software from the early project stage with essential data and information to take in consideration the previous eight steps since the early project stages. Development in the construction industry has always been connected with the development of raw and building materials. However, this era has different rules where the development of the construction is connected to the digital technologies. The rhythm of digital technology is very fast, therefore, in the coming years will see a rapid transformation and development of the construction industry.

Translated by: Hayat Mansour.

TECHNICAL SUPPORT FOR BUILDING INFORMATION MODELING TOOLS



Ahmed Lotfy

Well, let's say you're working on Revit and Navisworks together at the same time, you're opening AutoCAD program to always check original files of the project, perhaps a music player is running to remove tension, then Outlook program receives an e-mail, perhaps browser is working on the back also to upload or download some files and a few Excel pages ...etc. This is the everyday life of the designer or the engineer if it is not more complicated than that by more operations. So all of these operations certainly require a device with acceptable specifications to do all the above mentioned and also system operations which work in the background, and you cannot see it.

I remember well the first computer that I used in 1998 with the Windows 95, a shameful storage space and a funny RAM compared to what we have today, but does the performance of current devices generally and operation system especially improve if it compares with these devices in 2003 for example?

No, was the answer of 90% of my friends even some of them said that the old devices were better than current ones even it did not face today's problems. The real reason of this is that software and hardware companies always preserve a formula (software/hardware= 1) for commercial purposes. It means that whenever the power and speed of devices increase, the volume of the program and its calculations also increase, so you do not feel any improvement and try buying the newer ones again.

By a simple analogy, whenever the power of car's engine increases, car's weight also increases so you will inevitably get the same speed and performance unless you pay a large sum. This is what software manufacturers want to get; a technological piece that breaks this equation or you behave intelligently to break this equation by playing with variables. I'm going to explain now how to make your device fast and excellent. I will divide the topic into two parts (Hardware and Software).

First hardware:

When you issue a command with a click of the mouse in your hand to your computer, information is read from the hard drive then it is transferred to RAM. After that, it is transferred to the processor to be processed and the results are returned to your hard disk again to write it then the results are transferred to RAM or graphics card if it is separate and supported. So finally, results are displayed on the screen, and you see it, and then you issue the second command, the third and so on.

Hard drive:

You can note that the beginning and end of the operation are performed on the hard disk. The increase of RAM and processor is not the only thing which makes the difference. If you increase the power of processor and RAM, the performance will not be improved unless you increase the speed of the hard drive. So, you should replace the hard disk with a faster one every two or three years, or you should choose the latest disk when you purchase a new device to ensure that you will not change the disc for five years at least. Most hard drives today are HDD type, and they make the same loser equation with today's huge programs. Well, you can change the hard drive to SSD type which is three times faster and notice the difference. You can choose hybrid hard drives which are made up of two parts HDD and SSD and its price are acceptable. Now, you can install the main driver and necessary programs on the SSD disk, keep everything else on the other disk and enjoy a great performance!

RAM:

It moves information from the hard drive to the processor. Whenever it has a large space and fast in packing and unloading, it will be better in performance. So, you will need to choose the fastest type of RAM that is compatible with your motherboard and operating system 64 or 32.

Channel Transmission:

You must have heard the bottleneck expression. This happens when water and air try to pass in opposite directions from the same narrow nozzle then the nozzle locks and water and air delay in transit. This is exactly what happens in the computer between going information to the processor and returned information from it so you should make sure that your computer has two channels in its motherboard, not one channel.

Processor:

The processor is recommended to be multi-core. As above-mentioned, you can assign one core or more for each program which will make you able to determine the priority of programs in work. All that can be managed by opening Task Manager and choosing one of the main processes. After that, you can press the right button of the mouse and choose set affinity to assign the number of used core or set priority to determine the importance. The results of the tests of the processor or Pass Mark is another important thing that you should notice it when you buy a device, and the seller does not tell you about it. Pass Mark is a company that does performance tests for each processor according to a standardized test including all the work that may be done by the processor.

You can view these results and choose the best processor which is compatible with you from the site: http://www.cpubenchmark.net/high_end_cpus.html

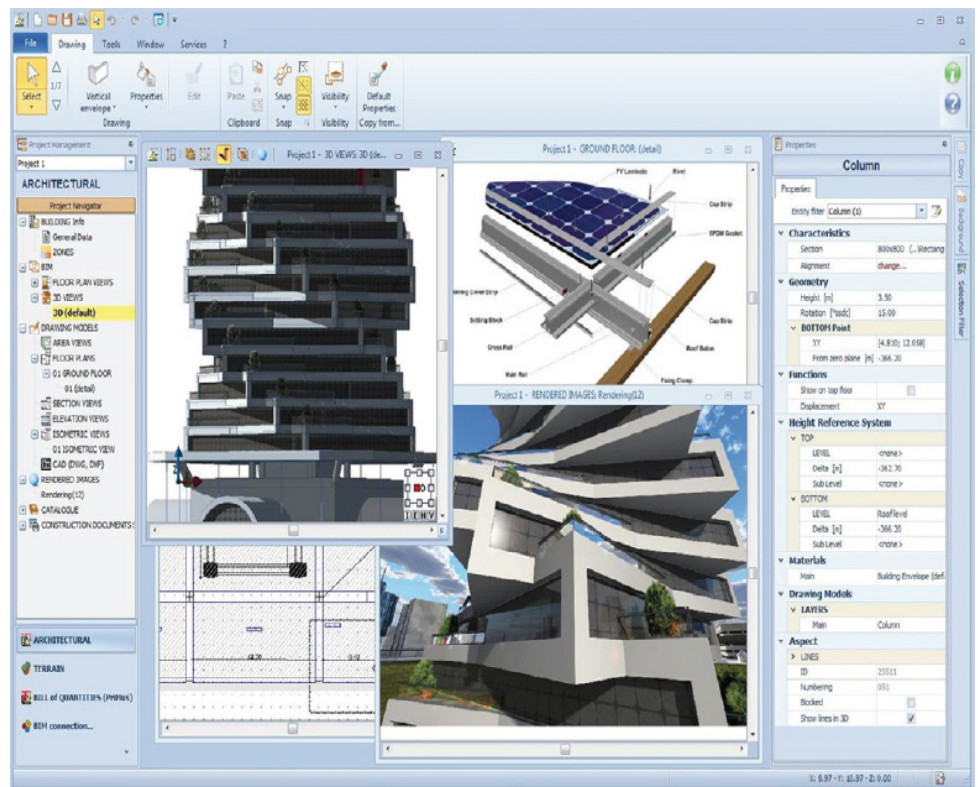
Display or so-called graphics engine:

This topic became more famous because of the competition to give a better appearance of programs after the emergence of science UI & UX and then move to support increased interaction between the computer and the user by providing an accurate presentation and accurate simulation for processing the input information which is exactly required in the case of BIM. To achieve this successfully without affecting those mentioned above such as processor, memory and hard drive, this engine must be independent and supported by a separate graphics card with separate memory, and it will be better if it is from companies that support games and engineering programs such as NVIDIA. (This section will be completed in the software section of the article "Connecting installed programs to devices").

Second Software:

Selecting the operating platform:

It is important that you should not use the latest operating platforms (such as Windows 10), because you will be surprised that you cannot install all your programs on this platform if the software company has not released a new update to its software to be compatible with the new platform. So, you should always make sure that you do it before you choose a platform. Besides, the new versions of the software are usually experimental, so do not be a test field for new software and applications.



Selecting and installing appropriate software:

You should stay away from pirated software because it may put you in legal liability if you are a resident of a country that protects electronic property, in addition to sometimes containing malicious software. Pirated software disconnects completely between the program and the manufacturer, which prevents you from repairing your program through a repair link which is sent to your email if your program encountered a sudden collapse and you decide sending a report to the manufacturer. So, we recommend educational copies. It is recommended to check the installation settings to select only the required programs and its installation locations when you install any program.

You should not install everything, but you should choose from the list which is suitable to your needs only to avoid consumption of storage space and processing from the hard drive. When you search the installation list, you will find plugins that help to link programs to others. These programs are not selected for installation in the default settings.

Management of devices, programs and files:

You should always try to update the parts of your computer through the hardware manager of the computer only and do not try to install a program to update the definitions. These updates will ensure the best performance of the pieces provided that it is already compatible. However, for file management, it is preferable to work on a system of archiving and classification; to organize your files by naming it short names, which makes it easy for you and the computer to access to the information to read and modify it and avoid you the consumption of hard disk space in the repeated files and wasting time in searching for information and deleting it by error.

Software Update:

As mentioned above, not all updates are useful because it may contain innovative tools. Some programs such as Autodesk follow the system of a programs manager for its software group that tells you every update and consumes a part of the hard drive. So, if you choose to install this program to catch up each new, you should first read the description of each update to know if it is useful or it is only an upgrade. You should keep in mind that updating always increases the program space on the disk and makes the program runs difficulty on your device.

Connecting installed programs to devices:

When you purchase a specialized device in engineering programs or games, you will find that the graphics card is separate and supported by a separate memory. It is recommended to confirm the availability of support for the software before purchasing the device. Here you should only visit the manufacturer's website and download the electronic widget definition software which is compatible with your software then you should activate the graphics accelerator option in your used program. Here the program will distribute the graphics effort in the competent device, and this will make you getting speed and better performance. Also, you can download performance improvement software from the manufacturer.

Dealing with Cloud storage programs and its synchronous services:

It is good to use cloud storage software especially for remote working on BIM models and common CAD files, but you should be careful where your program's sync file is located. It may decrease the system's movement by filling the hard drive. Most programs choose by default to be present in the System Disk C, and these settings cannot be changed by normal ways so you should set up the program normally then you can use a method called MKLINK. It is a method based on making the sync file in drive C imaginary without space and linking the program to another real file which will be used on another drive. This method is applied to make a convenient space for the movement of the main operation system in reading, storage, and transfer.

Translated by: Wesam Samak

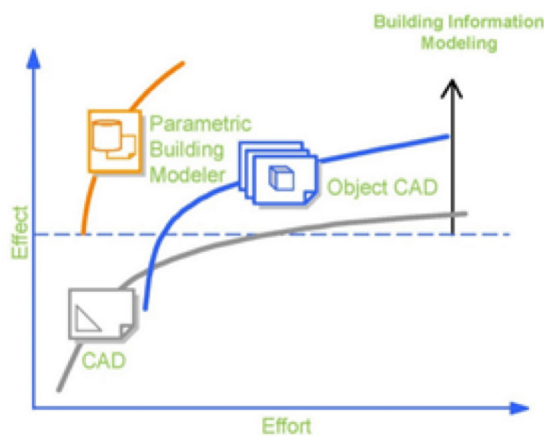
ADVICES SHOULD BE CONSIDERED DURING WORKING IN BIM AND REVIT

In the beginning, I do not claim that I have perfect experience and I can give governance and preach to those who are less experienced than me as well as I do not mean disrespecting work of anyone. The aim is sharing the gained experiences from anyone for all, and I know exactly that there are many professors of BIM in our Arab world have got much science what I do not have. So, I will mention the most important things should be considered during the work; it is the idea of Building Information Modeling which based on the information.



Amr Lashin

The characteristic features of this system are information, ways of information enter in three-dimension model and ways of data output to link it to different programs.



Information and ways of information presentation are the main reason for the development of engineering drawing programs starting from two-dimension drawing phase then three-dimension drawing phase and up to Building Information Modeling phase.

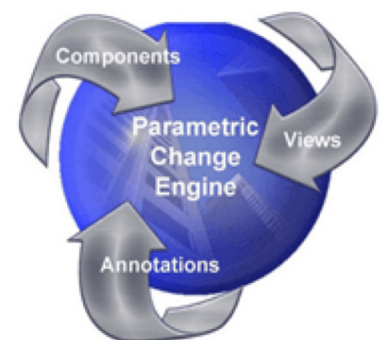
Information, parameters of information and mechanism of easy control of information are the ways of achieving time reduction, cost reduction, and project maintenance.

As shown in the diagram; time will be saved at a rate ranging from 20% to 50% by using the methods of BIM in the phase of preparation of engineering designs and required plans with due regard, giving enough time of entry building information correctly in the first design phase to be able access and show in the necessary plans for this phase.

Building Modeling or Building Information Modeling?

When I was searching about this subject, I liked an article and a blog of foreign firms When I was searching for this subject, I liked an article and a blog of foreign firms which are working in the field of building information link and the article's title was WITHOUT INFORMATION, BIM IS JUST BIM BASICALLY MEANINGLESS.

The author of the article Steve Crompton starts with mentioning the importance of information and information link to the three dimension model then he reviews the interest of United Kingdom Government in BIM system and methods of information linking to the various programs especially facilities management such as hospitals, government and security buildings.



While the blog is talking about the best known global systems for Building Information Exchange which is COBIE (Construction Operations Building Information Exchange.)

The article's title is to COBie or not to COBie?

The blog is talking about the definition of the building information exchange system, how to link them and standards that should be considered to achieve prospective benefits from the three-dimension model.

It is also talking about methods of evaluating three-dimension model concerning contained information size in the model; I recommend you to read this blog on the following link:

<http://practicalbim.blogspot.com.eg/2013/08/tocobieornottocobie.html>



The importance of Building Information Modeling and the cost it saves prompted decision-makers in major projects to apply consistent standards for evaluating the project depending on the method of setting up model correctly to ease input, update and output information in all phases of the project.

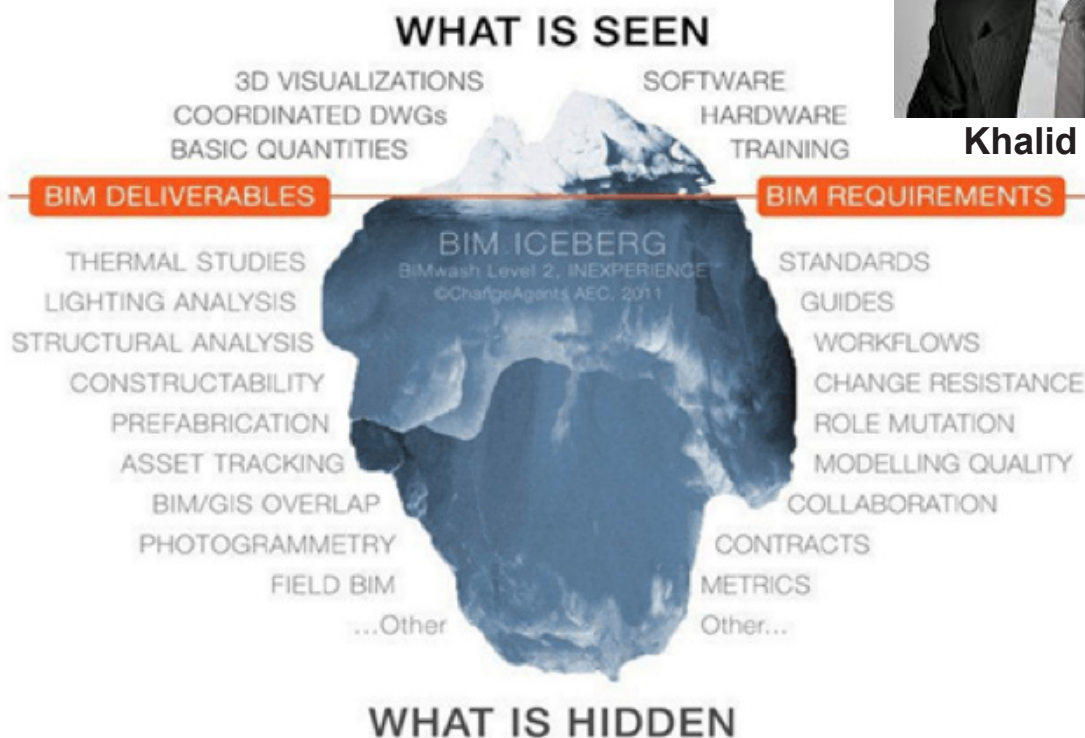
Some projects in our Arab world have already begun attempting to apply these modern systems in facilities management especially hospitals and government buildings.

Translated by: Doaa Mohamed.

AFTER FACILITY MANAGEMENT



Khalid Maher



The Importance of Building Information Modeling and what can it save from the cost-pushed decision makers in big projects is to apply uniform standards to evaluate the project. Depending on how the model is set up correctly for ease of entry and update of information and extract it in all phases of the project during the design, construction, operation and maintenance stages.

Some of the projects have already started in our Arab Land to apply these modern systems for the management of the facilities, especially hospitals and government buildings, I wish success for all.

BIM has now changed the way of facilities design and implementation, but is it possible to modify the management and maintenance way of a facility after delivery?

There is a lot of interest and concentration of the use of BIM in the FM or the Facility Management, but how it works and what are the gains resulting from the application of BIM in the FM?

Well, this article is divided into two parts: the first part will focus on facilities managers and applications of the FM and the second part will talk about the benefits of implementing BIM in the FM for the owner.

In 2004, a study was conducted in the US to estimate the proportion of loss which industry installations suffer. The result of this study was that in 2002 the annual cost associated with the incompatibility of the data transferred, its circulation and to link between them (Interoperability) among graphics, engineering, and programming systems was about 80.15 billion (thousand million) dollars!

This study also confirmed that two-thirds of this cost fall on the owners and managers of these facilities as a result of the continuous operation of the facility. These daily statistics lies on the facility director through daily updating the work reports by; calculating space-term research in the facility records to find a way of maintenance for any machine, such as heating water system, for example, when searching for an As-Built plan which had been filed previously and this, of course, will not be found easily in the first place.

Overall, the lack of integration and data transfer (Interoperability) has not considered the whole problem, but part of it. Is this limited data in a computer system worth to be published? We tend to overlook the quality issue of data and camouflage of the sad truth that often cannot be reliable on information produced by traditional design programs, therefore, it does not worth the effort required to share it. While the mark of BIM is that its information is coordinated, consistent and precisely calibrated in other words, it is valuable information that makes us to share it or to re-use it.

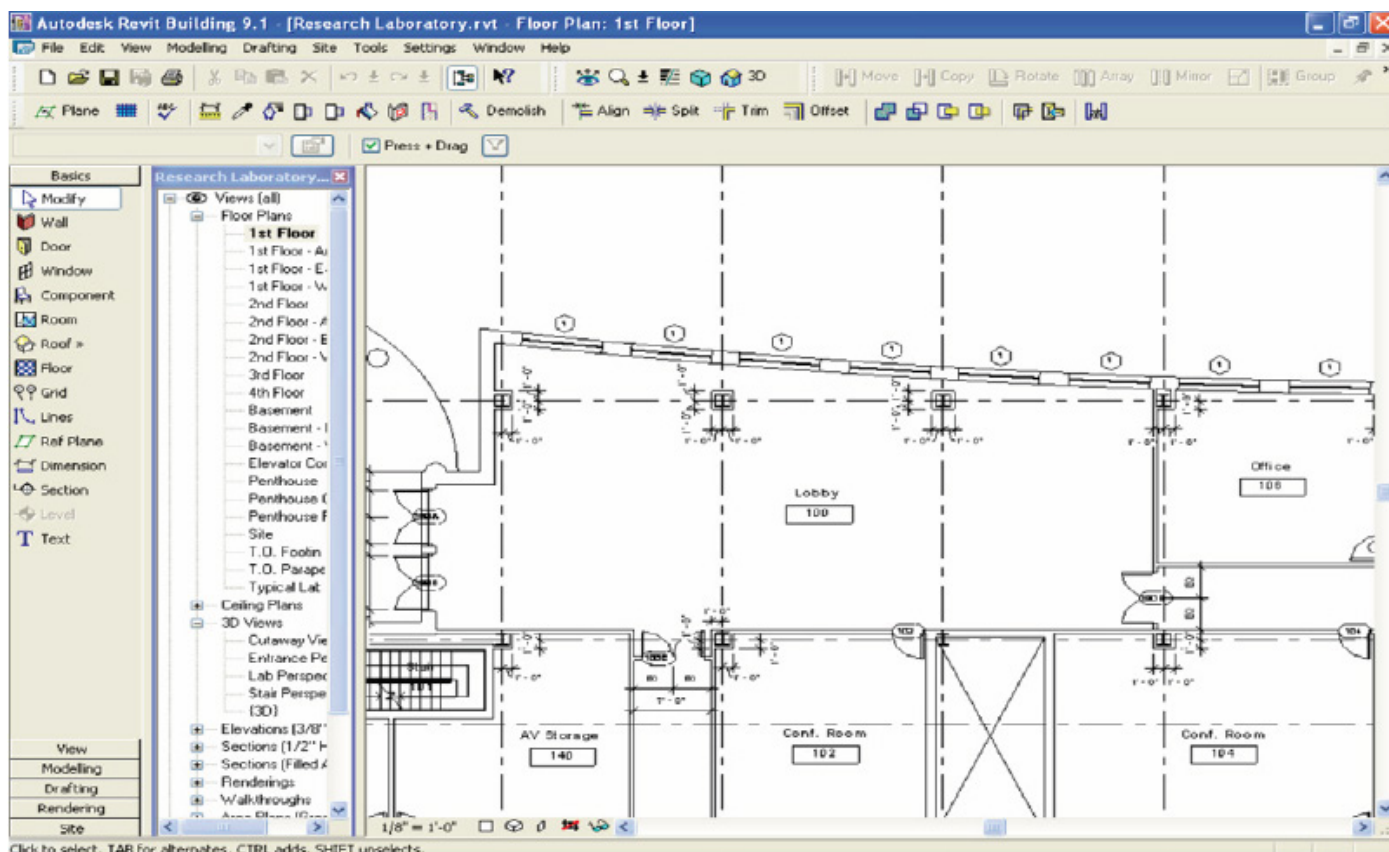
So the owner and the facility manager must reduce their share of the cost associated with shortages, lack and Integration of data (Interoperability) previously mentioned by using BIM with a high-quality model.

The Autodesk Company used DWF to make a connection between Autodesk® and Revit® program FM Desktop.

Management of spaces based on the DWF:

Development of DWF technology by Autodesk for distribution information and connecting design information without losing any critical data and also without having to know the recipient's software design. In this context; Autodesk FM Desktop interact with the DWF files which are extracted from the Revit and automatically interprets all spaces and data rooms. This of course without the need for the FMDesktop user to know the Revit program.

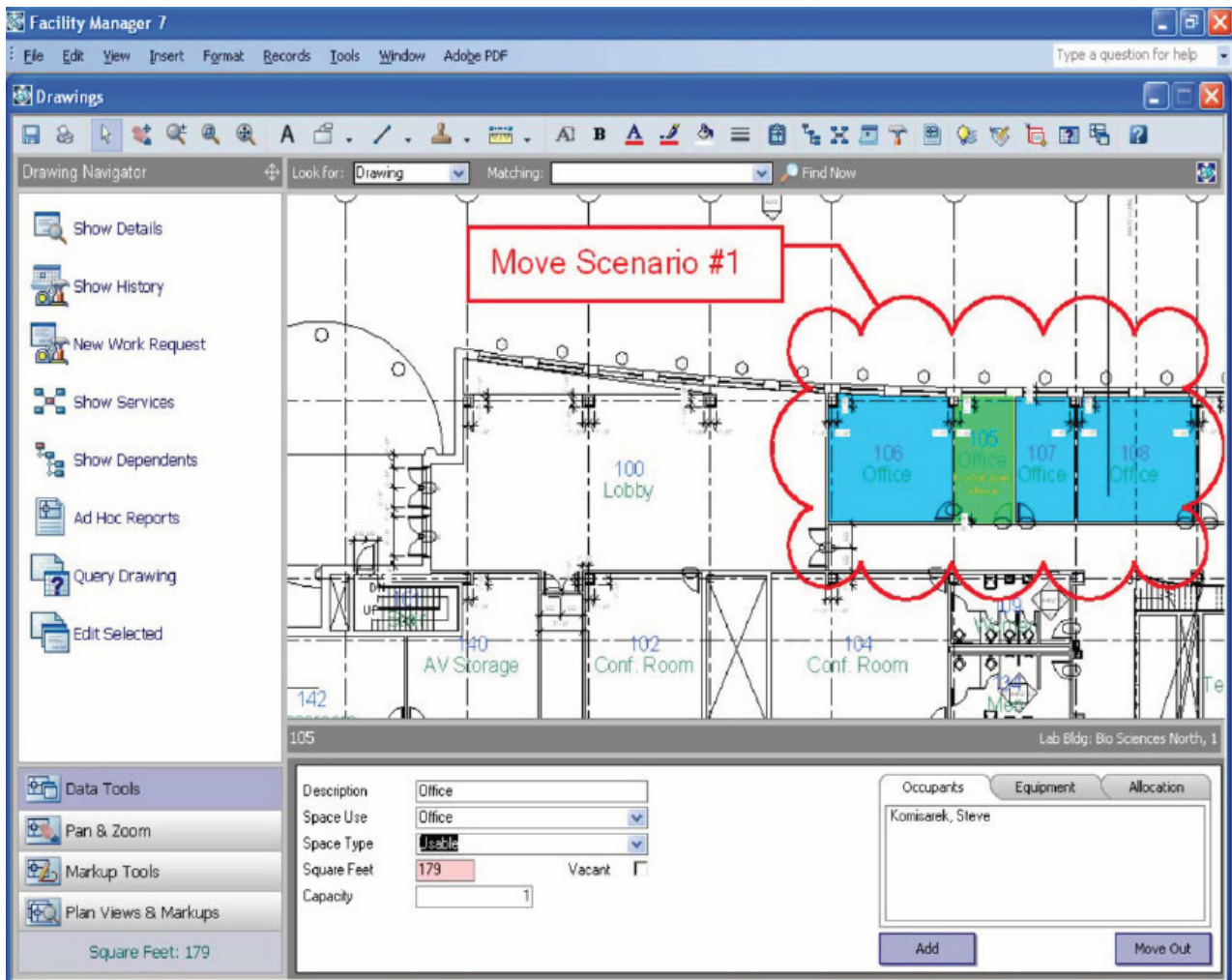
This approach, of course, varies from that which uses the traditional process Computer-Aided Facilities Management (CAFM). The facility manager makes a survey of floor plans to be used in applications of CAFM. CAD files can be used, and extraction floor plans of them and he uses to make a closed area (Polyline) to define an area and define the number of rooms to label this space. The time it takes to do this process manually for the commercial building might stretch from days to weeks. Therefore it is considered unpractical way that wastes time and effort. However, using the DWF file, the information will be moved smoothly from Revit to FM Desktop.



Until recently (in developed countries of course) the Architects used to face difficult decisions when a client asks for their help to enrich the information and data for their model with CAFM system. He refuses and makes a pressure on the client and thus lose the client, or accept and thus the work of a manual entry is boring for complex data to keep the client. However, now the architects use Revit so it can be easy to spread BIM form for DWF and e-mail it to the client who uses FM Desktop. The client import DWF file to the FM Desktop which, in its turn, understands and reads the limits of the rooms and area, number and description of each space from DWF file. Also, making a comparison between the old and new data model for all project which will be implemented from the beginning of the year and the client refers to the new and removed rooms in the model, therefore, apply the updates on the CAFM model.

In addition to that DWF files can be designed by a variety of design programs using the free Autodesk® DWF Writer applications without the Revit. There might be some manual removal operations by the facility manager based on the quality of the data coming from the design tool and the extent of sincerity in transferring data to DWF file. However, the end-result is that the owners and operators of FM Desktop users can easily integrate data from multiple sources and also take advantage of the data coming from different engineers and contractors who worked on various properties, or spaces that have been renewed by using available tools.

Easily, Facility Manager can use simple tools in FM Desktop program to make a report with colored illustration drawing for rooms and their spaces and their facility floors falling with rooms numbers, spaces and the names of their owners ..., etc. DWF also facilitate cooperation between the facility manager and the architect of making changes in origin. For example, a facility manager can make a cloud in red, for instance, in a room for amendment and sends the DWF to the architect to take account of these amendment.



Acceptance of BIM trip to the facility managers expansion and spread BIM in design, using information modeling for the owner facility manager becomes an ordinary matter and we will show you some examples that we should put them in mind:

1. Government agencies like public services management in the United States of America (U.S. GSA) require creating models to all projects effective 2007.
<http://www.gsa.gov/portal/content/105075>
2. In order to facilitate the integration of the project life cycle process, the National Institute of Building Research (NIBR) named a Commission in 2006 to make national standards for Building Information Modeling.
<http://www.nibs.org/newsstory1.html>
3. The American Institute of Architects (AIA) studying how to modify their own contract documents to legalize the transfer of the BIM model.

The second part:

In a previous article; we talked about a new dimension began, which soon began to take root in the advanced BIM operations due to its immense benefits. Perhaps these benefits, of course, will only be felt by owners of facilities and investors.

As we talked earlier; the most prominent of these benefits is to improve the management of the facility after implementation and making necessary periodic maintenance for the better optimization of energy ... etc.

-Is this possible?

= This is not a question that must be asked! However, why facilities owners approved on applying BIM processes despite the increase in the cost?

-Excuse me! Increasing of the cost?

= Maybe at first glance you would think that it is not supposed to increase the cost.

-Oh! is it reasonable that owner wants to pay additional money?!

= Let me continue what I have started, and you will get my intention smoothly.

The conversion and working in BIM Processes & Tools is a great thing regarding results of all individual, therefore this conversion will result in an increase in the cost of facility for 10% to 20% of the total cost of the facility and this is not a small amount. So facility owners must fully understand these processes, as the results will get.

-You did not answer my previous question which is: What are the motivating means for facility owners, which called for the adoption of the BIM process?

= OK; it is time to answer this question, but the answer to this question is, throughout our conversation in this issue where we end by listing these benefits in the previous article in the latest issue.

BIM process allowed the owner of many benefits that were not previously possible, and most important of these benefits that have been mentioned earlier:

- Early Evaluation of the design
- Frequent complications in the design.
- Providing a convenient time for marketing.
- Reliability and cost management.
- Quality.
- Sustainability.
- Asset Management.

Now let's talk about the benefit of all of these benefits individually....

1. Early Evaluation of the design

Owners must have the ability to manage and assess the field of design, according to their desires and needs, at every stage of the project. Currently, facilities owners depend on designers to imagine the facility and move inside it (Walk Through) through graphics, images, and animations (Rendered Animation). The client demands of the facility might change, but it's hard for the owner to ensure that all their demands have converged with each other.

When the owner cannot interpret and understand graphics and tablets this entails having difficulty in searching for stakeholders private data. So the facility owner can take advantage of BIM with the help of its design team for:

This tool is called (BIMStorm) a working environment and a process which has been developed by (Onuma System), which enables:

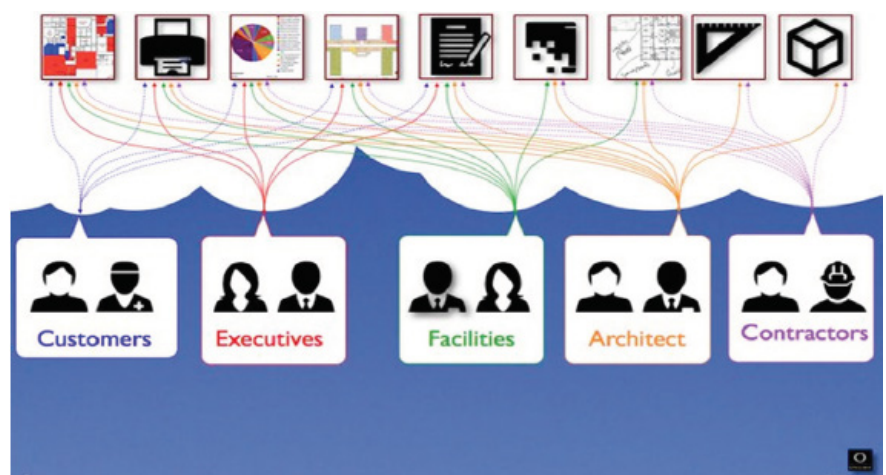
A-Integration of the program requirements:

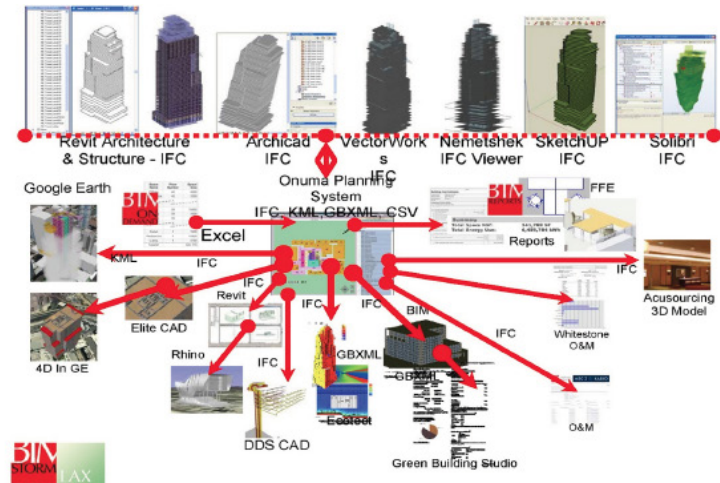
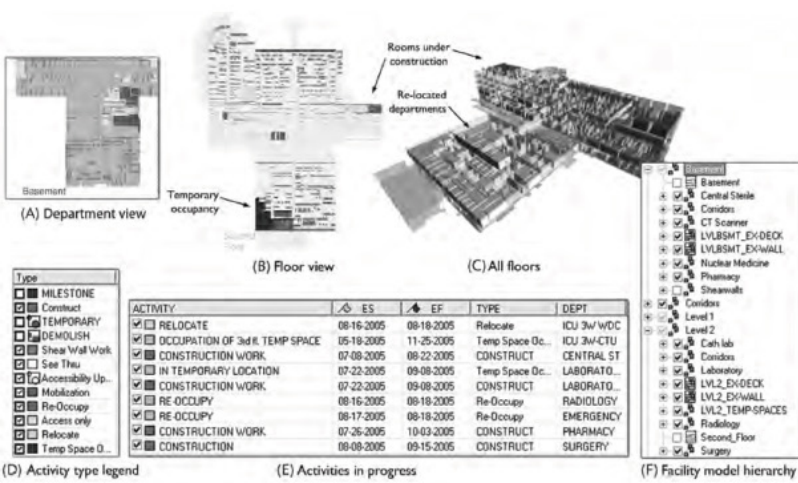
During the feasibility study stage; facilities owners work with their consultants to develop programs and achieve their needs. Often they perform this process with little responses regarding the feasibility study and cost. An excellent tool which is capable of facilitating and simplifying the process has appeared from the terms of the article it looks complex, but it is not, of course, for those who understand it. Facilities owners and participants from all disciplines contained in the project and stakeholders of make a perception of a project and since the inputs of any part in the project, whether architectural or structural. For example making a real assessment of a replica of the model to be implemented in the various design options for cost, period and sustainability perspectives. Moreover, for example; this photo was taken at one of these sessions where the team developed a model by using a realistic program.



B-Receiving the largest stakeholder contributions to the project through visual stimulation (Visual Simulation):

Owners often need a physical help of investors and stakeholders who either do not have enough time or difficulty about understanding the information provided by the project. The figure is a picture of a group of owners and judges who are reviewing the court building as planned. The figure is a fourth-dimension image for hospital floors showing the link of implementation process sequence for each section and to get comments on its possible impact on the hospital's objectives. The traditional use of technologies is to walk through real-time (Real-time walk-through) they are events occur for once, while it makes BIM process and 4-D tools explore designs What if (What If Designs) easier and more able to survive economically.





C- The speed of creating and exploring design scenarios:

The figure is an example of (Jacob Facilities) project which BIM have been used in the evaluation of design scenarios and needs analysis, budget and feedback the owner of the information.

Another approach directed specifically to help

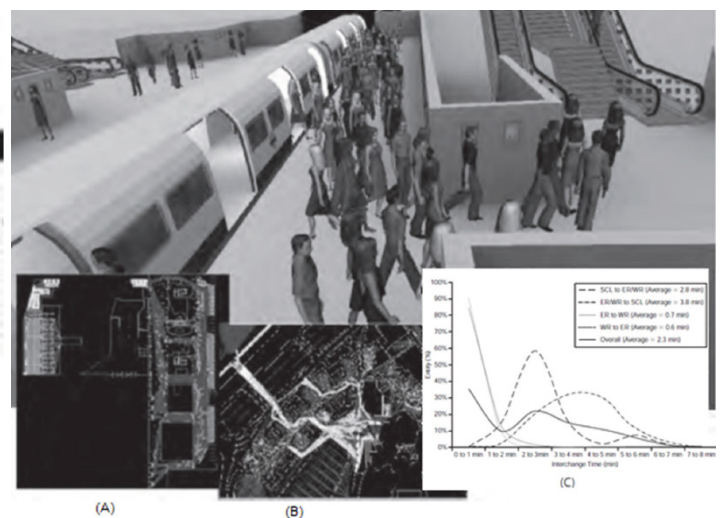


owners to assess quickly the feasibility of alternative building designs by DProfiler system presented by Beck Technology. This system provides cost, look, and energy analysis.



D-Simulation of facility performance:

Some owners may require additional types of simulations to evaluate the design quality which might include full performance in the facility or vacation emergency. The figure shows a simulated example of the crowded and in the subway station.



MALL OF QATAR



Main Contractor: AL Khayyat Contracting & Trading.

The Consultant: KEO International consultants

Project Location: Near Al Rayyan Stadium one of the stadiums that will host World Cup 2022

The total area of the building is estimated at 400,000 square meters in addition to the external courtyards, estimated area of 162 thousand square meters.



Mohamed Mesleh

Approximate total Cost: 5 billion Qatari Riyals.

Parkings: estimated by 7000.

Project delivery date: the fourth quarter of 2016 the soft opening was in 10th of December 2016

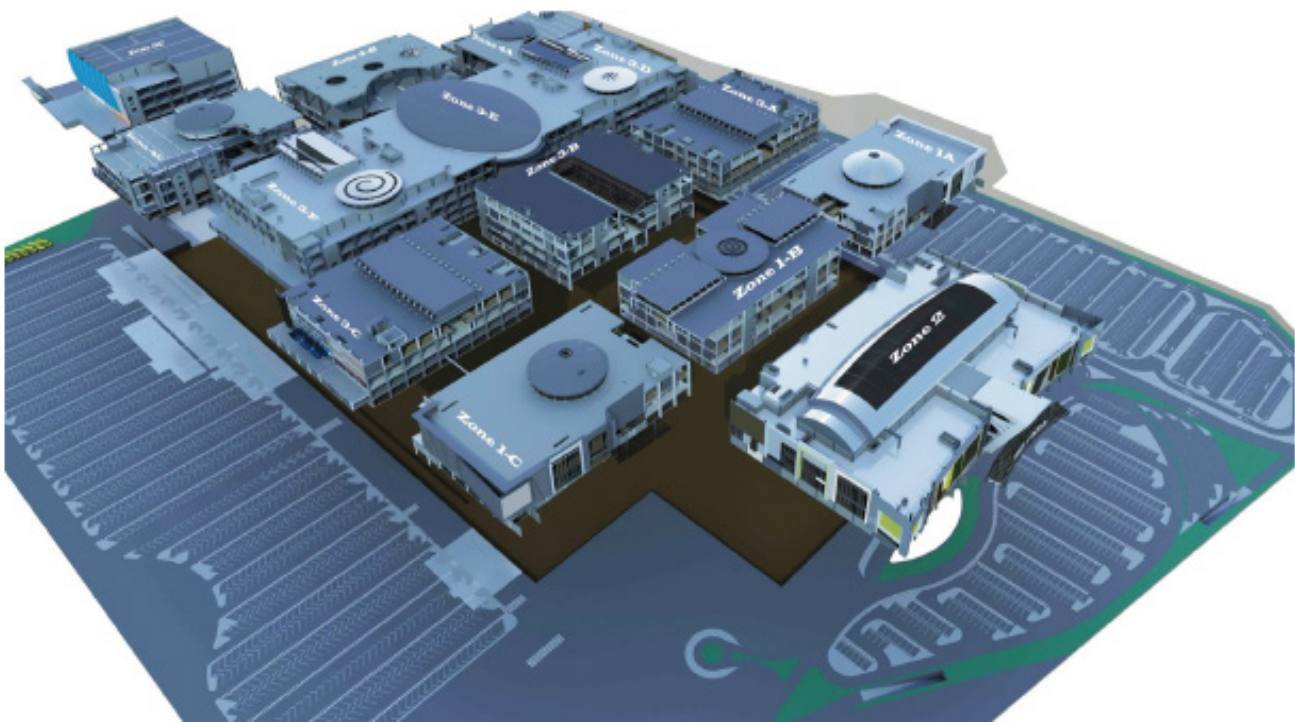
BIM Team: Mohammed Musleh & Omar Salim

After a brief overview & project information above it is clear to us the reasons that led us to write about the unique project which is one of the most interesting shopping and entertainment destinations in the region and the largest space in addition to that it has used technology of BIM, because of the cost of the project, area, and multifunctionality to avoid the loss of time and money as a result of design errors that results in conflicts between all sections.

As shown in the picture above incomplete Revit model for the project, which was prepared by the company's team and which I had the opportunity to be one of its members as well as one of the most prominent pioneers of BIM

Eng. Omar Selim, who used Autodesk Revit in modeling took several months since the team only consisted of four specialists.

Moreover, I am going to talk about the beginning of work on BIM Model, difficulties, and the most significant achievements. The first real beginning of the working model of the project in April 2014, which means that the BIM work started too late after the beginning of the project. We knew the model must be available before initiating the project to avoid the occurrence of errors during construction and to reduce wastage of materials resulting from design modifications. However, returning to that period, it was a specific project construction process at an intermediate stage, which means that it was possible to rectify what has been done.



The difficulties faced the team was the same difficulties faced by any team working with BIM in any project and the primary difficulties were:

1. The number of team members relative to the size of the project and the amount of the work required was very small.
2. Lack of awareness from other department's members on what is BIM, and to know that BIM not just 3D modeling.
3. Such technology had not been used in its correct place, and many were considering it as 3D modeling tool.
4. The absence of a BIM accredited system or method of work especially in implementing company.
5. The lack of Families files and recourses used in the project.
6. Get the necessary plans was not easy due to the number of sub-contracting companies were preparing shop drawings for construction.

The challenge to accomplish Model in the shortest possible time was huge considering the acceleration of the construction work on the site. The task of modeling the Architectural and Structural Models, with a lot of different details then delivering the Models to MEP company to solve clashes, which was the main goal of modeling in this stage.

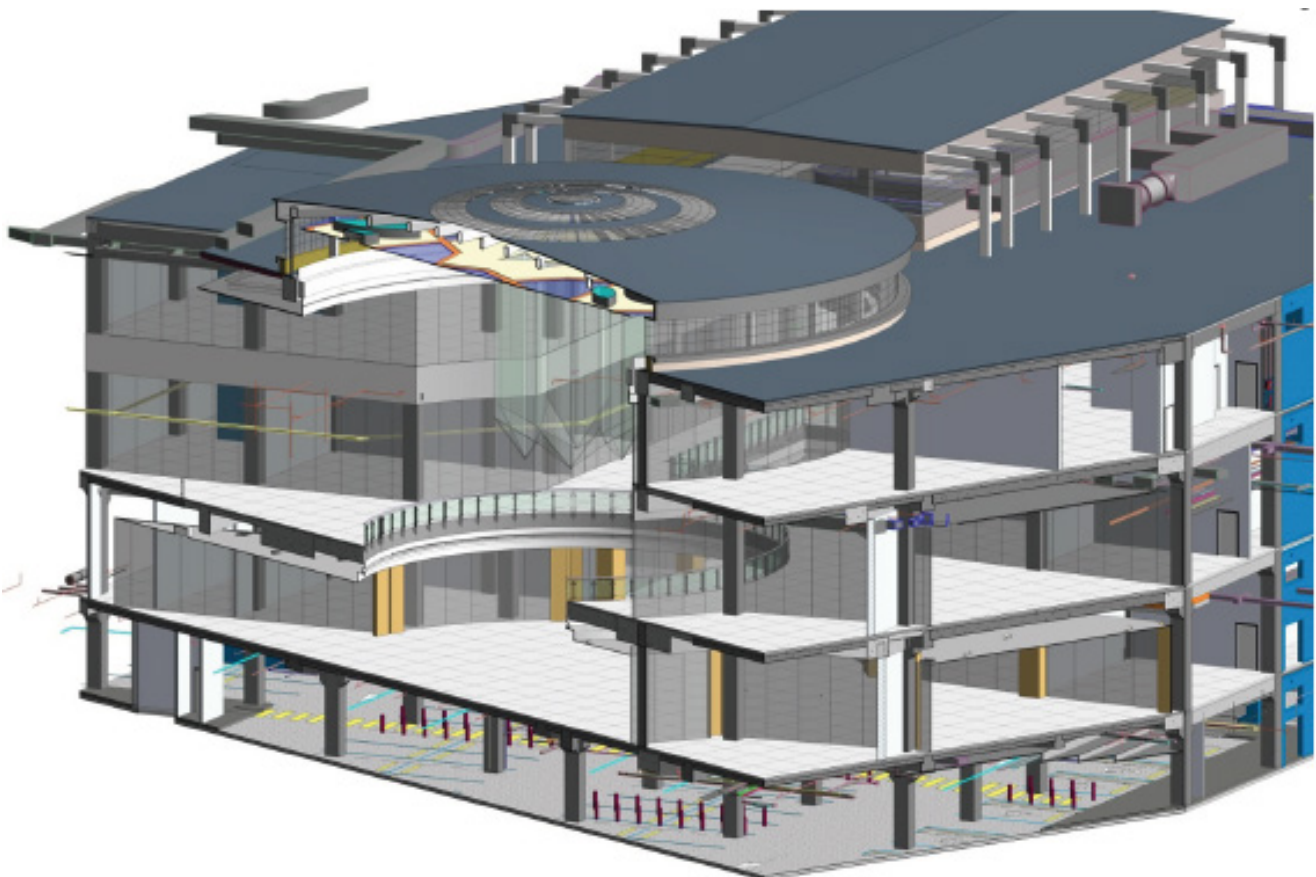
1. Prepare the project's Template file, which was needed to be used in a 16 zone as per the project divisions.
2. prepare the Parametric Families for different sections of Structural items as columns and beams due to the use PreCast Concrete system details for most of the construction work.
3. Prepare the Parametric Families for various architectural details.
4. Prepare Shop Drawings by Revit.

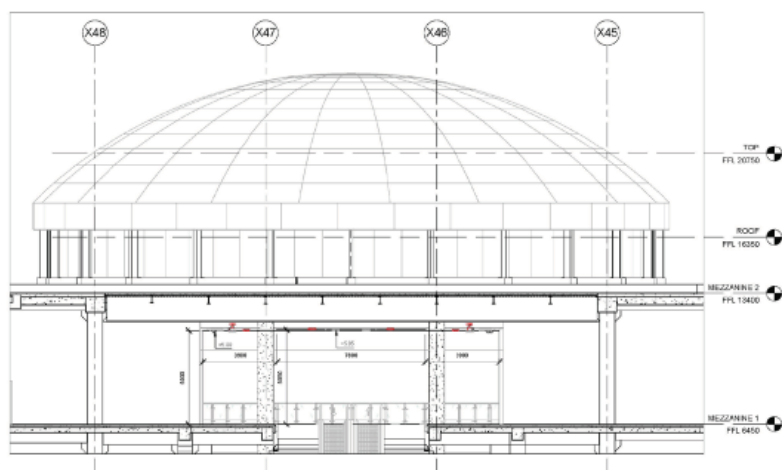
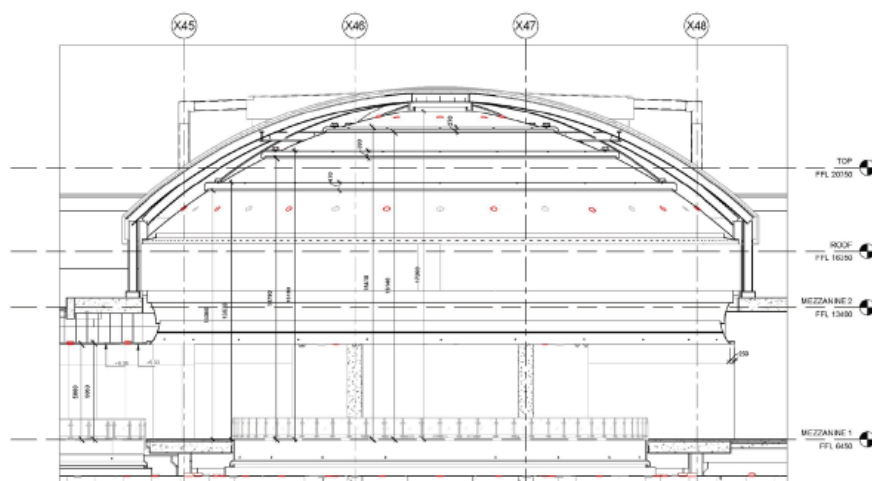
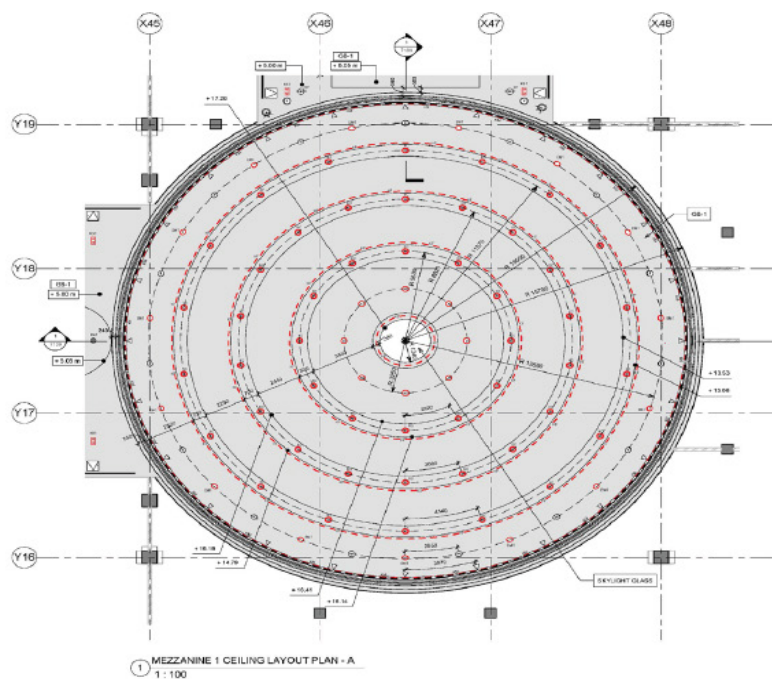
Clash Detection.

- 1- Proposals for action in some designs in a short time and presented to decision-makers.
- 2- Assist other departments to understand some of the details.

The amount of work which has been done is huge, the following basics of BIM work that we hope to do but many obstacles have prevented us from achieving it were:

- 1- Reaching and generating advanced models up to LOD400.
- 2- Linking Project models with Navisworks to produce 4D simulation.
- 3- Generate Materials take-off schedules and Quantities.



[illegible][illegible]

THE BIM DICTIONARY

The BIM Dictionary is a resource for all to freely use. It includes hundreds of Dictionary Items: terms with their descriptions, abbreviations and synonyms. Each Dictionary Item has its own page so it can be easily referenced in documents and websites. The BIM Dictionary is part of the BIM Excellence Initiative and BIMarabia translate it to Arabic language.



Omar Selim

Building Information Modelling (BIM)

Building Information Modelling (BIM) is a set of technologies, processes and policies enabling multiple stakeholders to collaboratively design, construct and operate a Facility in virtual space. As a term, BIM has grown tremendously over the years and is now the 'current expression of digital innovation' across the construction industry.

2D Documentation

A Model Use representing how 2D Drawings are extracted from information-rich 3D models. 2D Documentation typically include 2D plans, 2D section, 2D elevations and 2D details.

Similar terms: 2D Cad, 2D Drafting.

2D Drawing

A digital or hardcopy document containing two-dimensional drawings generated either by a CAD System (e.g. AutoCAD or Draftsight) or a BIM Software Tool

Similar terms: CAD Drawing, 2D Document.

Concepts: Deliverable Document.

3D CAD

A generic term referring to three-dimensional computer-generated representations. 3D CAD typically refers to data-poor models generated through surface-modelling (e.g. generated through Trimble SketchUp) and solid-modelling (e.g. generated through Autodesk 3DS Max) rather than data-rich Model Components generated through one of many BIM Software Tools.

Similar terms: 3D Models, CAD Models, Geometric Models.

Concepts: Representation.

3D Detailing

A Model Use representing how three-dimensional details are extracted from information-rich 3D models. 3D Detailing typically include hybrid 2D-3D annotated views.

Concepts: Model Use.

3D Laser Scanner

A fixed or mobile unit generating Point Clouds using LIDAR (Light Detection And Ranging) technologies.

3D Modelling

The use of software tools to generate three-dimensional geometries, either as surfaces (e.g. Trimble SketchUp) or non-parametric solids (e.g. Autodesk 3DS Max).

3D Print

A manufacturing technique which transforms a virtual three-dimensional element (CAD or BIModel) into a physical object. 3D printing is either an 'additive' manufacturing process whereby 'printers' build the physical product 'layer upon layer' using a special solidifying liquid or a 'subtractive' manufacturing process whereby the printed shape is extracted from a solid mass.

3D Printing

A Model Use representing how 3D models are used as a base to generate 3D Prints either directly from within the main BIM Software Tool or through specialised 3D printing software.

4D

The fourth modelling dimension (4D) refers to 3D + time. That is, a model or a modelling workflow is considered to be 4D when the time is added to model objects to allow Construction Scheduling.

5D

The fifth modelling dimension (5D) refers to 4D + cost. That is, a model (or modelling workflow) is considered to be 5D when cost is linked/embedded within BIModels and Model Components. 5D is used for the purposes of generating Cost Estimates and practicing Target Value Design.

BIM Execution Plan (BEP)

The BIM Execution Plan (BEP or BIMxP) is developed by suppliers - typically pre-contract to address the Employer's Information Requirements (EIR) - and defines how the information modelling aspects of a project will be carried out. A BIM Execution Plan clarifies roles and their responsibilities, standards to be applied and procedures to be followed. A BEP collates/references a number of other documents including the Master Information Delivery Plan (MIDP) and the Project Implementation Plan (PIP). The BEP may be updated after the contract has been awarded...Also refer to BIM Management Plan (AU).

CONCLUSION

Praise be to Allah who facilitated producing the third issue of the magazine with his help and strength, and we apologize for any error or omission beyond our well.

And we wish to share a little in this rapidly growing field as our Arabic region need someone who mastered the BIM.

“Innovation in the construction sector is undergoing a major transformation in the Middle East, and the region's mega-projects such as the Dubai World Expo 2020 and the World Cup in Doha, which are opening up new horizons for design areas. The government's mandate to expand the application of Building Information Modeling software confirms the desire of the Middle East region to be equal with the world's leading innovation centers in the field of building and construction. Starting from building information modeling software passing through the 3D technics software (horographic) till the building management programs, we will provide the best technical practices that help construction and engineering companies in the Middle East achieve greater innovation and excellence”. Said Paul Wallett, Regional Manager, Tekla Middle East.

“We have been able to use the Building Information Modeling software in the Khalifa Bin Zayed Al Nahyan Mosque Project to model and design most complicated columns and arches which have facilitated the design process and solved the problem of incompatibility with HVAC issues. We confirm our commitment to further innovation in the usage of building information modeling software in the UAE and the region. Thanks to Tekla software, we managed to win three massive engineering projects.” Said Srinivasa Roa Vibarla, head of design at Eversanday Engineering, which designs the Sheikh Khalifa Mosque.

We also invite all specialists to join and enrich the Arab scientific material with their article and contributions

The Prophet Mohammed (peace and blessings of Allaah be upon him) said: "The rewards of the good deeds that will reach a believer after his death are: Knowledge which he taught and spread; a righteous son whom he leaves behind; a copy of the Qur'an that he leaves as a legacy; a mosque that he built; a house that he built for wayfarers; a canal that he dug; or charity that he gave during his lifetime when he was in good health. These deeds will reach him after his death."

It was narrated by Ibn Majah and Ibn Khuzaymah and Hasan by al-Albaani.

We are honored to receive your questions at bimarabia@gmail.com which we will answer in the following issue.

Best regards, Omar Selim

BIMarabia



Masjid Ibn-Tolon