

Erasmus+ Project ID: BIMVET3 2020-1-ES01-KA203-083262

This Erasmus+ Project has been funded with support from the European Commission. This publication reflects the views only of the authors, and the European Commission and Erasmus+ National Agencies cannot be held responsible for any use which may be made of the information contained therein

BLOCK II_COMPUTER TOOLS

BIMVET3 Tutorial No 4

**Title: COORDINATION AND QUALITY CONTROL OF PROJECT
INFORMATION MODELS**

1 - Aims

The objectives of this tutorial are as follows:

- Get acquainted with and to use the criteria for the coordination and quality of project information models.
- Be able to identify and to know the purpose of participants in the coordination of project information models.
-

2 - Learning methodology

- The teacher will provide an explanation of the material with examples.
- Students will read this lesson and analyze examples of the video.
- To evaluate the achievements of practical teaching, each student will write short descriptions and answer questions provided.

3 - Tutorial duration

The practice described in this tutorial will be carried out in a computer classroom.

It will last 1/2 teaching hours.

Note: duration of the tutorial depends on teacher professionalism.

4 - Necessary teaching resources

Hardware requirements: computer room with computers equipped with access to multimedia and internet.

Required software: Autodesk® BIM 360™, BIM 360 COORDINATE Model: Coordination module.

5. Tutorial Contents

COORDINATION AND QUALITY CONTROL OF PROJECT INFORMATION MODELS

5.1 Introduction

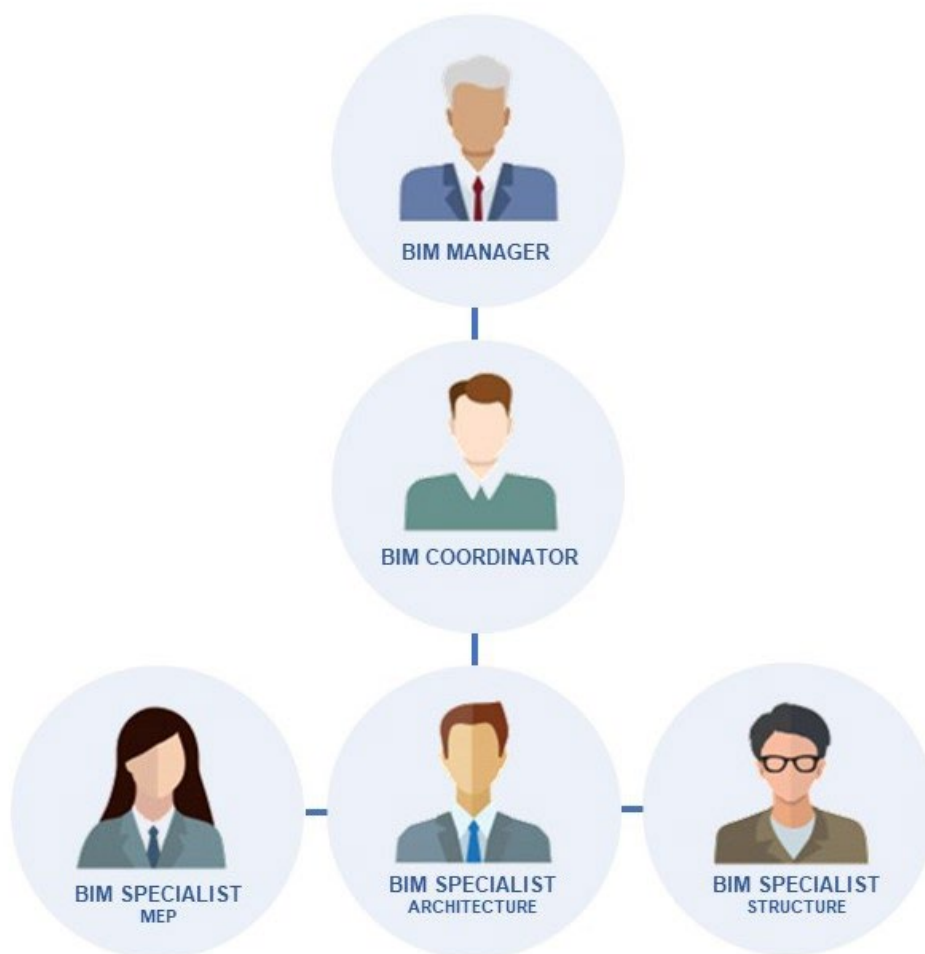
Coordination and quality control of the digital models is performed by the BIM coordinators of the disciplines together with BIM project manager. This cyclical process is performed at least once every two weeks throughout the project period.

5.2 BIM roles and responsibilities

Specialists from various fields, such as architects, designers, surveyors, etc. participate in the BIM project process. Each of them prepares a set of project documentation (drawings and models) and is responsible for their results. The specific requirements of any discipline are documented in the BIM implementation plan and cannot be changed or taken over by a participant in another discipline throughout the project. The matrix of responsibilities and representations of the project digital model is a part of the project BIM implementation plan. Each model has an identified responsible party (executor, ‘initiator’) and an appropriate level of model development for each project component and development phase, as well as the appropriate amount of documentation for the phase. The roles and responsibilities of the BIM project are presented in Table 1.

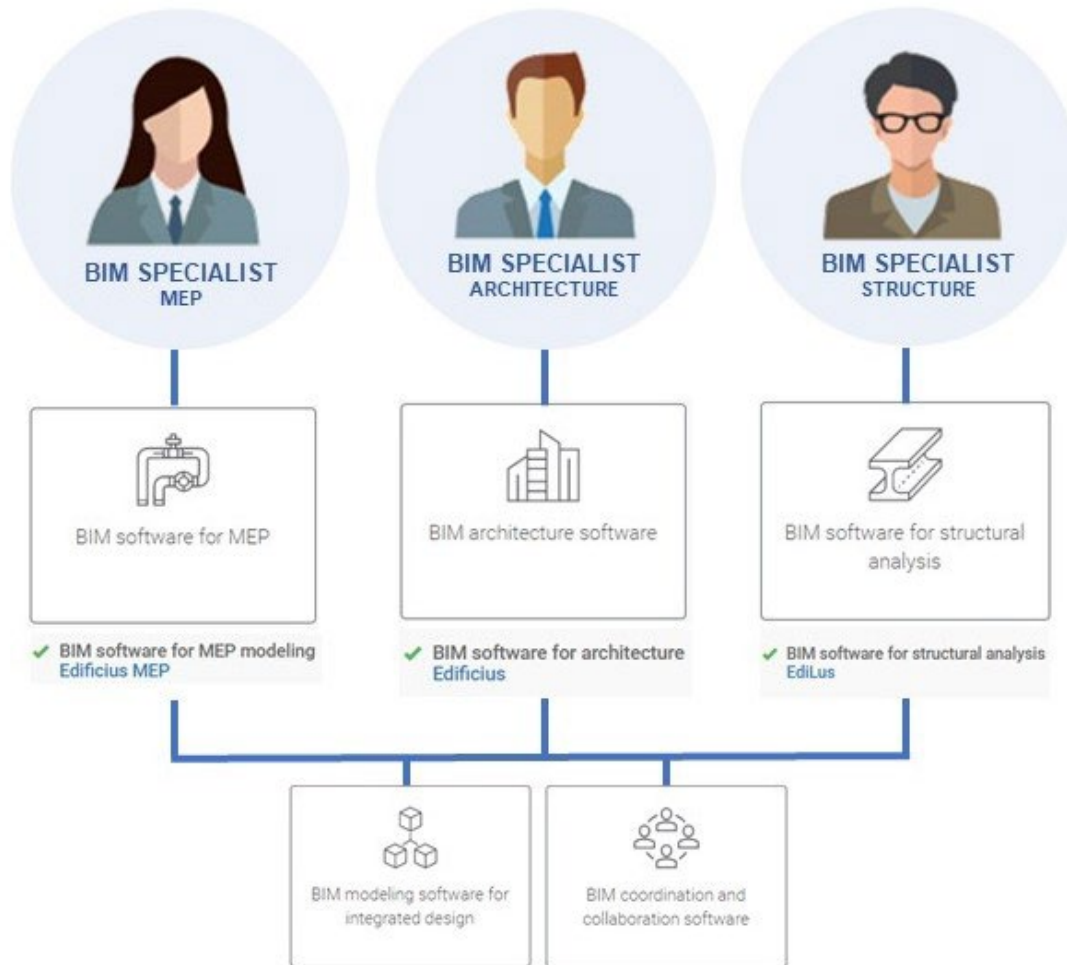
Table 1. BIM roles and responsibilities

	Strategic							Management			Production	
	Objectives	Research	Process and Workflow	Standards	Implementation	Training	BIM Execution Plan	MIDP	Model Coordination	Content Creation	Modelling	Drawing Production
BIM Manager												
Project Manager												
BIM Coordinator												
BIM Modeller												



Each model has a defined responsible party (executor, “initiator”) and a targeted level of model development for each stage of project development.

Representatives of each project discipline may not modify models of other authors that have been developed by another author according to another specification, nor may the models be used (modified) for other purposes according to the requirements of another specification. All parties involved must discuss in advance the possibility of redistributing ownership of the models, for example, issues of model ownership transfer to another discipline.



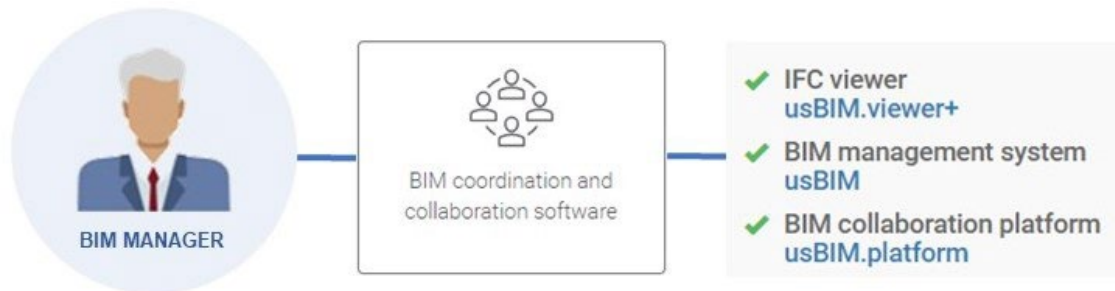
Responsibilities can be shared, for example, the constructor is responsible for the internal (retaining) walls of the building, and the architect is responsible for the external non-retaining walls of the facade. If such a problem cannot be technically solved with the help of the BIM tool, the parties must clearly allocate responsibilities, albeit for a limited period of time.



The project team (designers) is responsible for developing project models. The Project Manager and / or the BIM Manager are responsible for the transfer of the final versions

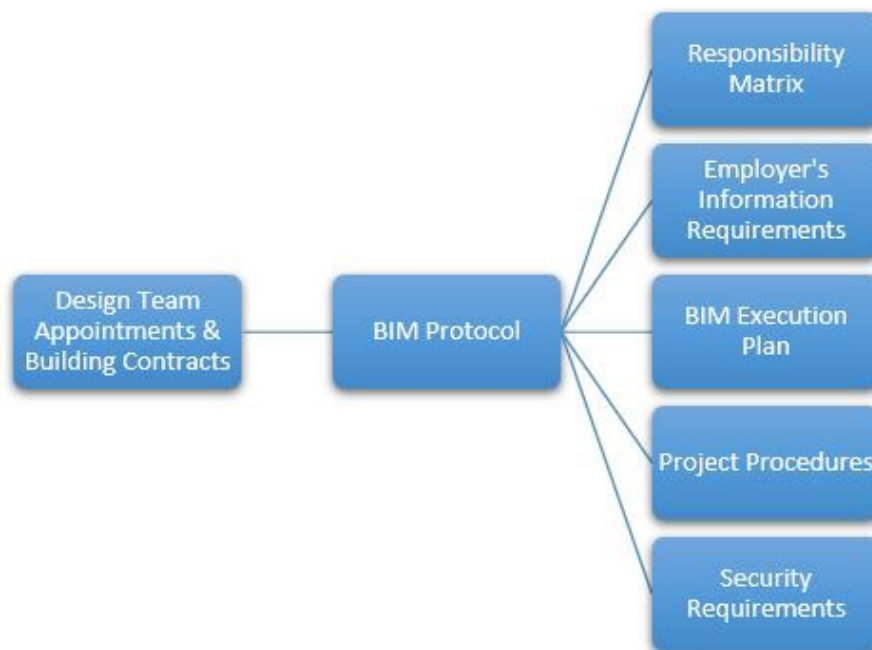
of the models combined at the request of the Customer. The models may be transferred on the basis of the common data environment used in the project (where the common data environment allows the viewing of 3D models; in this case the Client has the possibility to view as many parts of the project models as and transmitting such a package).

When defining the ownership rights of the project team, follow the document ‘BIM protocol. Initial proposals for draft provisions of BIM normative documents’.



The BIM protocol is an annex to the contract. The main purpose of this document is to facilitate the development and use of building information (BIM) models at identified stages of a project. The protocol ensures that the parties would be required to provide the identified works or services by using BIM models, and it is also aiming to help project teams apply effective collaborative practices when working with a central project repository.

The BIM protocol must be included in the agreements of all parties involved in the BIM project (members of the BIM project team). This ensures that all parties, involved in the development and submission of BIM models in the co-developed product, would apply all the common work organization methods and standards set out in the Protocol, with clearly defined responsibilities and rights, including copyright and property rights, in a uniform manner. The protocol is a contract document (annex to the contract) that governs the contract in terms of the content of the BIM.



Data security requirements apply to the project's common data management platforms. Benchmarks are determined according to the project objectives and standards described in the Customer's requirements, the BIM Implementation Plan (BEP), and other agreed standards and good practice guides. The compliance is ensured by BIM coordinators and project manager.

<https://www.youtube.com/watch?v=riue16NwgKI>

https://www.youtube.com/watch?v=cUkW2jjNC_w

In order to ensure effective cooperation and communication between the different participants in the project, the following minimum functions shall be selected in the central repository, which stores information about the construction project:

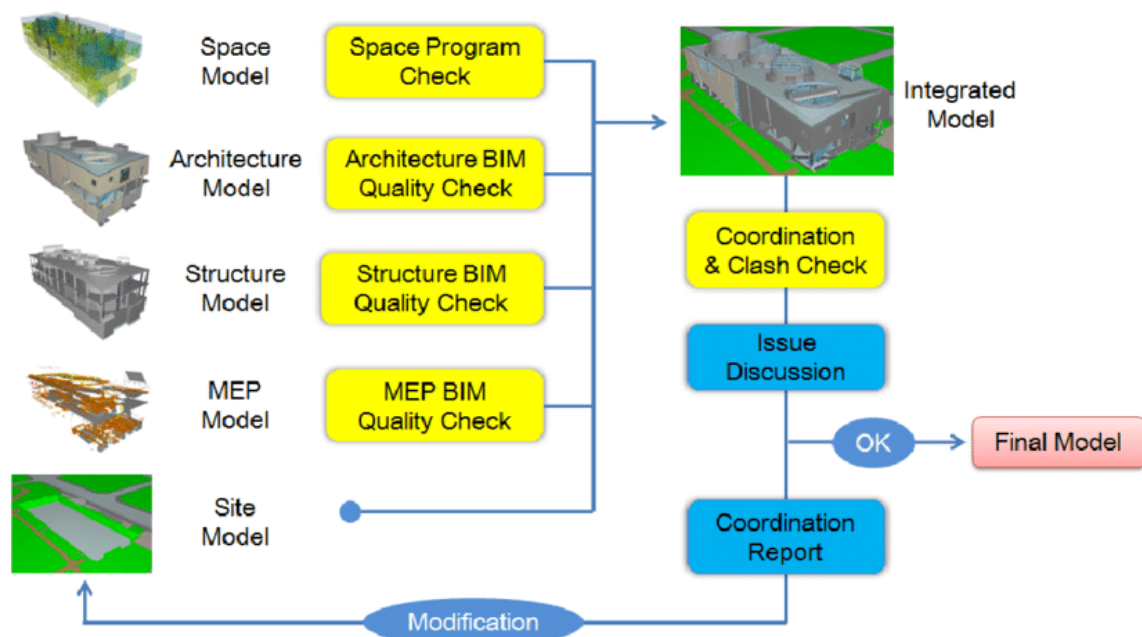
- Security and control. Possibility to restrict users rights, register participants' actions.
- Database. Ability to upload documents, create a directory structure.
- Versioning. Creating document versions while avoiding an excessive

number of documents.

- Read / load data formats specified in the ERMS. Ability to open model file formats in CDE environment and perform comment / comment function.
- Access via smart devices (tablet, mobile phone).

5.3 The quality check of digital models is performed in several stages

- **Visual inspection:** ensures that there are no unforeseen components of the model, the correct software for the project is used, the objectives of the project are met.
- **Incompatibility check:** reviews model problems identified by the software when there is an incompatibility between two components of the construction model.
- **Verification of compliance with standards:** ensures compliance with BIM and CAD principles, standards, and requirements.
- **Model integrity check:** checks for incorrectly defined, repetitive elements.
- After such digital model checks, BIM project manager prepares reports, which can be finalized in various formats (.pdf, .xls, .bcf, etc.) depending on the requirements of the project.



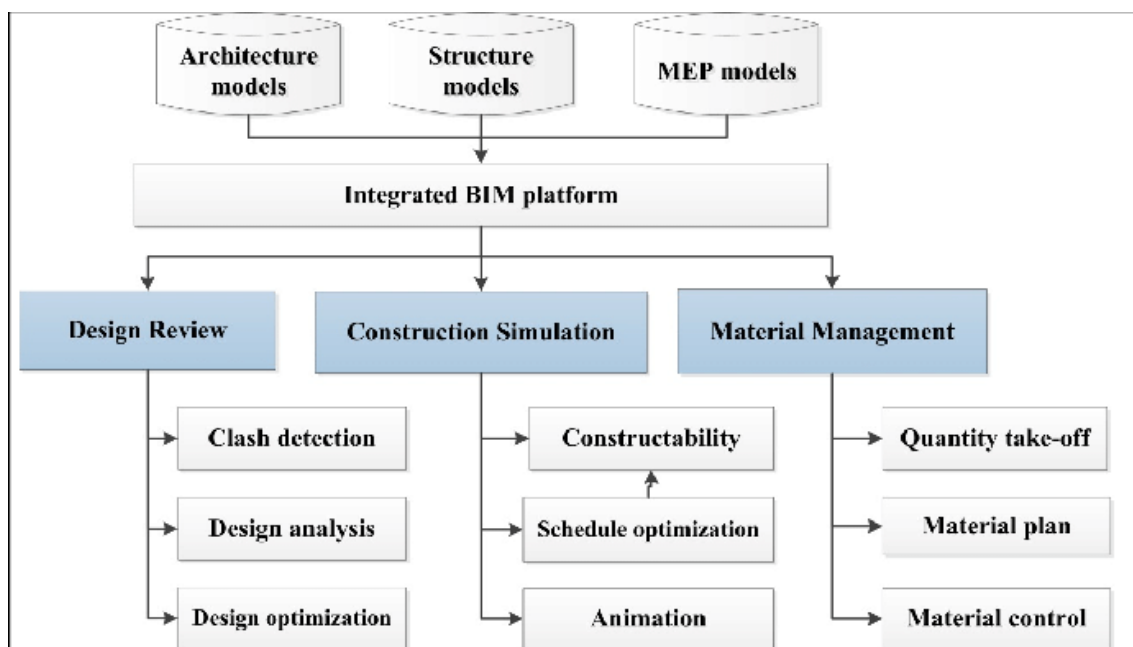
5.4 Checks on conflicts and nonconformities

During the project preparation, checks for model collisions and discrepancies are performed cyclically. These checks are carried out by the project participants, the BIM coordinator, and the BIM manager within certain limits of responsibility:

- Designers perform the collision check in the scope of their design part using the reference model method, loading the models of other project participants, and modeling their own components.
- BIM coordinators may carry out visual inspections to verify whether team models are compliant with the norms: file names, project starting point co-ordination, a specific supervised part of the project information compliance requirements (LOIN matrix), etc.
- The BIM manager checks the collisions of all submitted parts and the compliance of the whole project.

The checks are performed in several ways:

- Visual viewing of models.
- Using special tools for collision checking.



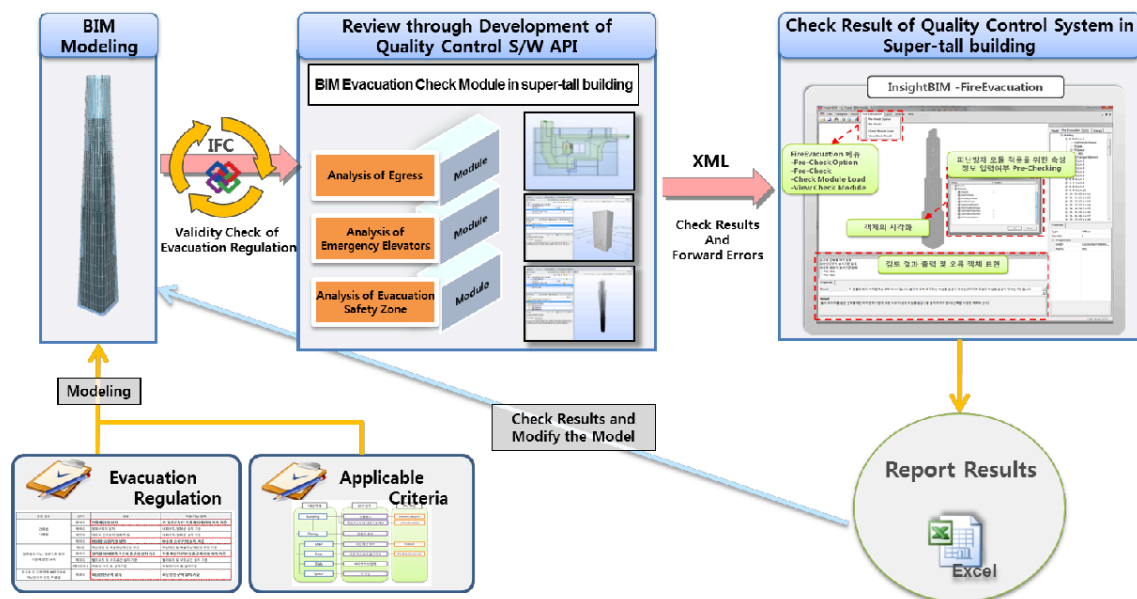
5.5 Information quality control

The BIM Manager and the BIM Coordinators, in addition to checking the conflicts and discrepancies, also ensure the compliance of the models with the requirements of the Customer and the defined requirements of the BIM project implementation processes. Using special tools, separate element information (provided in the LOIN matrix), compliance with regulations and other requirements can be checked.

QUALITY CONTROL

- Model information filling
- Geometric quality of the model
- Collision analysis
- Proper modeling of elements
- Quality of drawings

Quantities and other information derived from the model, product descriptions, product codes, methods for calculating volumes / areas / quantities, units of measurement and specifications must be described in the BEP and agreed with the builder (customer) or project manager.



https://www.youtube.com/watch?v=USnoYmN_7II

<https://www.youtube.com/watch?v=K-Dz8v71OVg>

<https://www.youtube.com/watch?v=4FnIIB5S14M>

<https://www.youtube.com/watch?v=UHpCEm1uYGc>

6. Deliverables

To assess the achievement of the practice, students will write a report of 2 pages maximum and will have to answer the submitted test questionnaires.

In this report, the student will explain used criteria for the coordination and quality of project information models.

7. What we have learned

The student has become acquainted with and to use the criteria for the coordination and quality of project information models.

The student is able to identify and knows the purpose of participants in the coordination of project information models.