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Implementing (Fourth, Fifth Dimensions, Clash Detection) of Building information Modeling in Jordan

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Authorization Form

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Abstract

Construction industry must play a key role in the duration of the project. It must be based on a solid foundation, human and human resources management and the exploitation of the gains mainly on society in a meaningful way.

With the tremendous technological development of our time, the role of Building Information Modeling (BIM) has been widely seen in the recent period due to the development of modern software and simple to use compared to other software to meet the requirements of BIM beneficiaries and the integration of all parties of the project (the employer) Consultant and contractor), and designers of the program from various disciplines architectural, construction, mechanics, electricity and health work also where they are integrated and the link of information between them.

The purpose of this thesis is to study how to use BIM to apply the fourth dimension (Time), the fifth dimension (Cost), to explore intersections of various elements, and ways to solve these intersections.

The study included the selection of one of the buildings in Jordan - Khalda - after review of the previous studies. Based on the drawings plan, Elevations, the building was modeled by Autodesk Revit software. The fourth and fifth dimensions were applied to the Autodesk Navisworks.

The researcher has discovered through previous studies that the discovery of intersections during the design process reduces errors and problems during the implementation phase, and reduces the project time from the traditional methods. One of the best programs to explore intersections (Autodesk Navisworks).

Finally, the researcher recommends the application of BIM technology for engineering projects and the training of engineering personnel in companies in Jordan to make the most of the engineering project information during project life cycle.

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List of Abbreviations

Abbreviation	Meaning	Description
2D	Two-dimensional drawing	A 2D drawing
3D	Three-dimensional model	A 3D model containing geometrical information about a building
4D	3D + time	A 3D model linked to time or scheduling data
5D	4D + cost	A 3D model linked to time and cost data.
AEC	Architecture, Engineering and Construction	Used when referring to the whole industry surrounding building construction projects
BATID	Element Identity	IFC specification based on Element ID
BCF	BIM Collaboration Format	A pre - release, submitted to building SMART under the new "Affiliation Scheme" to become an official building SMART specification
bcfzip	Zipped BCF file	Compressed BIM collaboration file format
BIM	Building Information Model / Modeling / Management	Concept and method of generating and administrating building data
BIPS	Byggeri, informationstek nologi, produktivitet, samarbejde	Membership driven, non-profit association working for Danish construction companies
BSI	Building SMART International	A neutral, international and unique non - profit Organization supporting open BIM through the life cycle
CIFE	Center for Integrated Facility Engineering	Academic research center for virtual Design and construction of AEC industry projects
CII	Construction Industry Institute	A consortium the purpose is to measurably improve the delivery of capital facilities
CAD	Computer - Aided Design	The use of computer technology for the design of objects
CD	Compact Disc	Unit for storing of data

Abbreviation	Meaning	Description
DWF	Drawing Format	A compressed 2D/3D drawing format developed by Autodesk, contain design data, graphics and text
DWG	Drawing	A binary file format used for storing 2D and 3D design data
FM	Facility Management	Interdisciplinary field devoted to the coordination of business support services, associated with maintenance functions in buildings
GC	General Contractor	Responsible for the day-to-day oversight of a construction site, management of vendors and trades and communication of information to involved parties throughout the course of a building project
GUID	Globally Unique Identifier	A 128-bit number used by programs to uniquely identify the location of a data object.
HVAC	Heating, Ventilation and Air Conditioning systems	Heating, ventilation and air conditioning systems used in buildings
HTML	Hyper Text Markup Language	A web-browser based clash detection report, which allows images and data to be stored
ID	Identity	Term used for object or item uniqueness
RFI	Request for Information	Primarily used to gather information to help make a decision on what steps to take next
PEP, BXP	BIM Execution Plan	facilitating the management of information
RVT	Revit project file	Architectural/Structural/MEP design project created with Revit
TBS	Tekla BIM sight	Clash detective software from Tekla
TXT	Text	Standard text document that contains unformatted text
XML	Extensible Markup Language	Used to define documents with a standard format that can be read by any XML-compatible application

Abbreviation	Meaning	Description
IFC	Industry Foundation Classes	Open file format that is being developed with the goal of becoming a universal information exchange standard in the industry
ITO	Information Take-off	Data gathering and capturing of information available Within a BIM model
LBS	Location Breakdown Structure	Relates to a physical or logical breakdown of the project
LOB	Line-of-Balance	A graphical scheduling method focusing on continuous resource utilization in repetitive activities
MEP	Mechanical, Electrical and Plumbing	Mechanical, electrical and plumbing building services or the engineering disciplines associated with them
NW19	Navisworks Manage 2019	Autodesk software package used for engineering design review and 4D
NWC	Navisworks Cache File	File containing geometry and metadata in the native format for Navisworks. It enables models to load more quickly
NWD	Navisworks Published Data File	File format which stores all project assets in a standalone document for review
NWF	Navisworks Review File	Master file format containing NWC file(s)
PDF	Portable Document Format	A compacted file that captures document text, fonts, images and even formatting of documents from a variety of applications
PFA	PFA Ejendomme A/S	The owner/client for the building case described in this thesis
QA	Quality Assurance	Set of procedures intended to ensure that a product or service under development meets the specified requirements
QC	Quality Control	Set of procedures intended to ensure that a product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer
MP	Manage Project	Temporary endeavor undertaken to create a unique product, service or result.
LOD	Level of Development	Core to the concept is that the level of development defines the content and reliability of BIM elements at different stages or milestones.