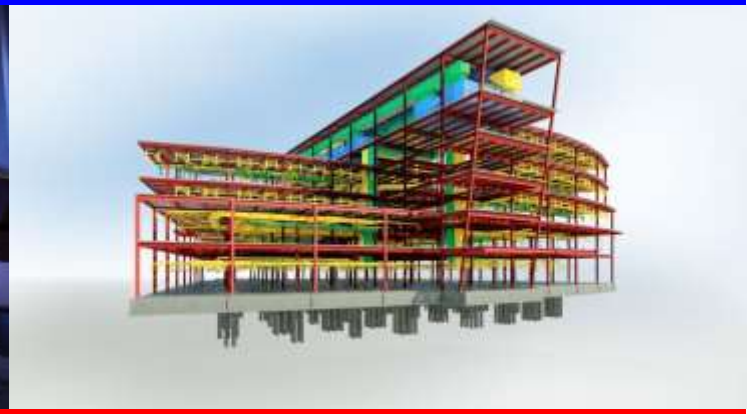
AT THE FOREFRONT OF THE CONSTRUCTION INDUSTRY WITH BUILDING INFORMATION MODELING (BIM): THE CHALLENGES

19th October 2016

BY: IR. SHARIFAH AZLINA RAJA KAMAL

hss ENGINEERS

hss BIM

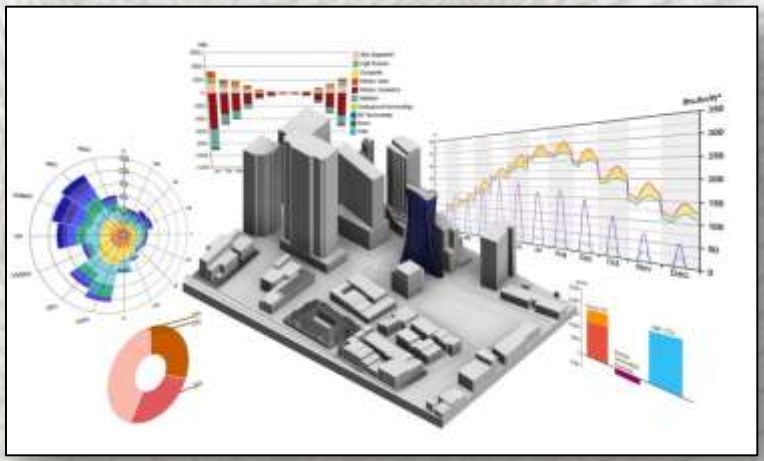
What is BIM ?

WHAT IS BIM ?

TECHNOLOGY ?

SOFTWARE ?

PROCESS

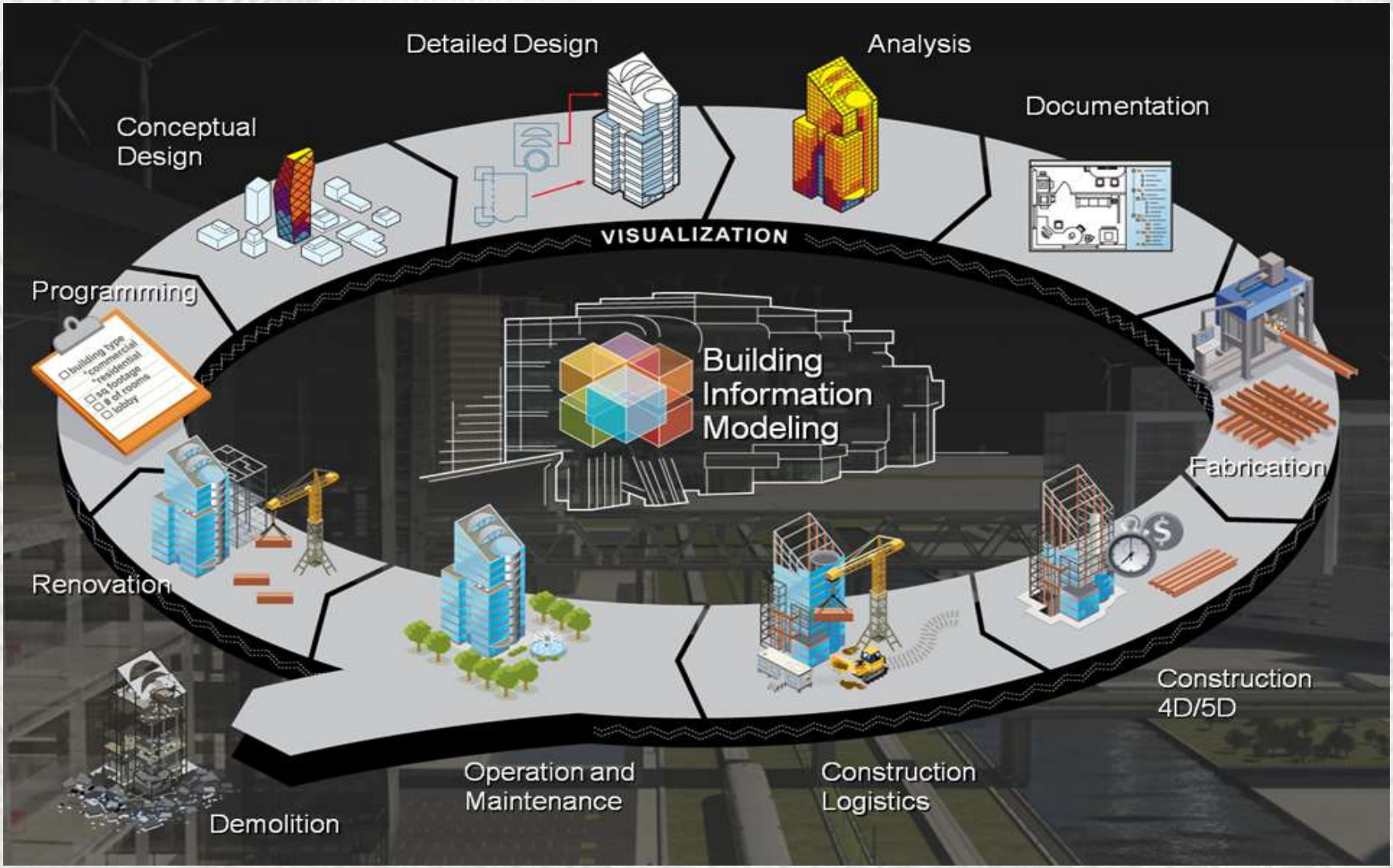


WHAT IS BIM ?

“ Building Information Modelling”

A process in Developing, Collating & Managing high level information of an asset, from its inception, design, construction and ultimately operation & maintenance.

BIM – PROJECT LIFE CYCLE



Why BIM ?


REVIT?
ARCHICAD?
BIM USES
MANAGEMENT
SEE LEGAL...
LEGAL
INSURANCE
BIM
REF LEGAL
PROCESS CHANGE
TECHNOLOGY

WHY BIM ?

Why BIM ?

- *Enhances all – stage progress visibility*
- *Increases productivity through collaboration amongst industry players*
- *Reliably and accurately visualize the project at early stage providing clearer understanding of design intent & facilitate in modification to achieve desired outcome*
- *Identifies interface issues, detects & addresses conflicts / clashes early*
- *Eliminates time-consuming changes at later stage*
- *Eliminates time-waste by resolving complex construction details before going on-ground*

MAJOR ISSUES IN CONSTRUCTION

Lack of project co-ordination	Time & Cost over-runs
Manual bill of quantities or no integration	No accuracy in Job Costing & Budgeting
Not feasible to integrate with facility management applications and preventive, corrective maintenance	Further investment needed for data procurement & incurring cost per year

BIM: RETURN ON INVESTMENT

- Up to 40% elimination of unbudgeted change
- Up to 80% reduction in time taken to generate a cost estimate
- Cost estimation accuracy within 3%
- A savings of up to 10% of the contract value Through clash detections
- Up to 7% reduction in project time
- Ongoing saving in Facility Management System

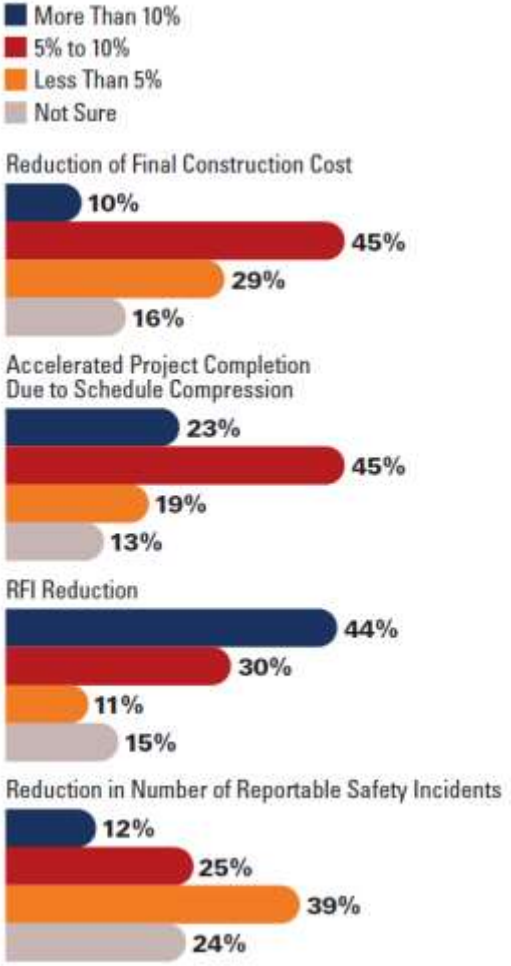
Source :
Stanford University Center for Integrated Facilities Engineering (CIFE) figures based on 32 major projects using BIM

BIM: RETURN ON INVESTMENT

Five Top-Rated Positive Impacts of BIM

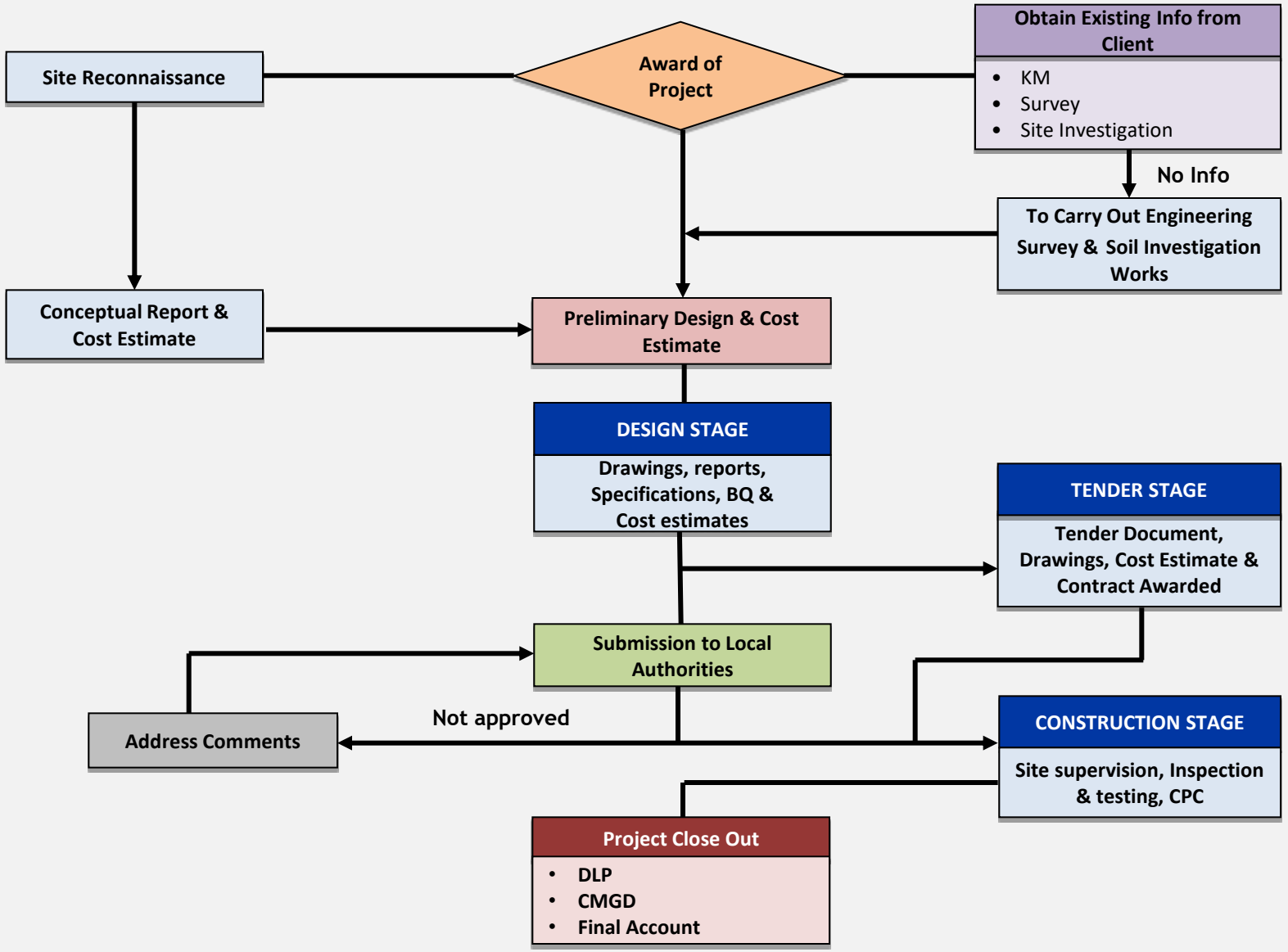
	Respondent Type	% Rating High or Very High
Improved Constructability of Final Design	Contractors	**74%**
Increased Owner's Understanding of Proposed Design Solutions	Owners	**73%**
Improved Quality / Function of Final Design	Engineers	**71%**
Generated Better Construction Documents	Owners	**70%**
Improved Ability to Plan Construction Phasing and Logistics	Owners	**70%**

Metrics for the Impact of BIM on Cost. Schedule, RFIs and Safety

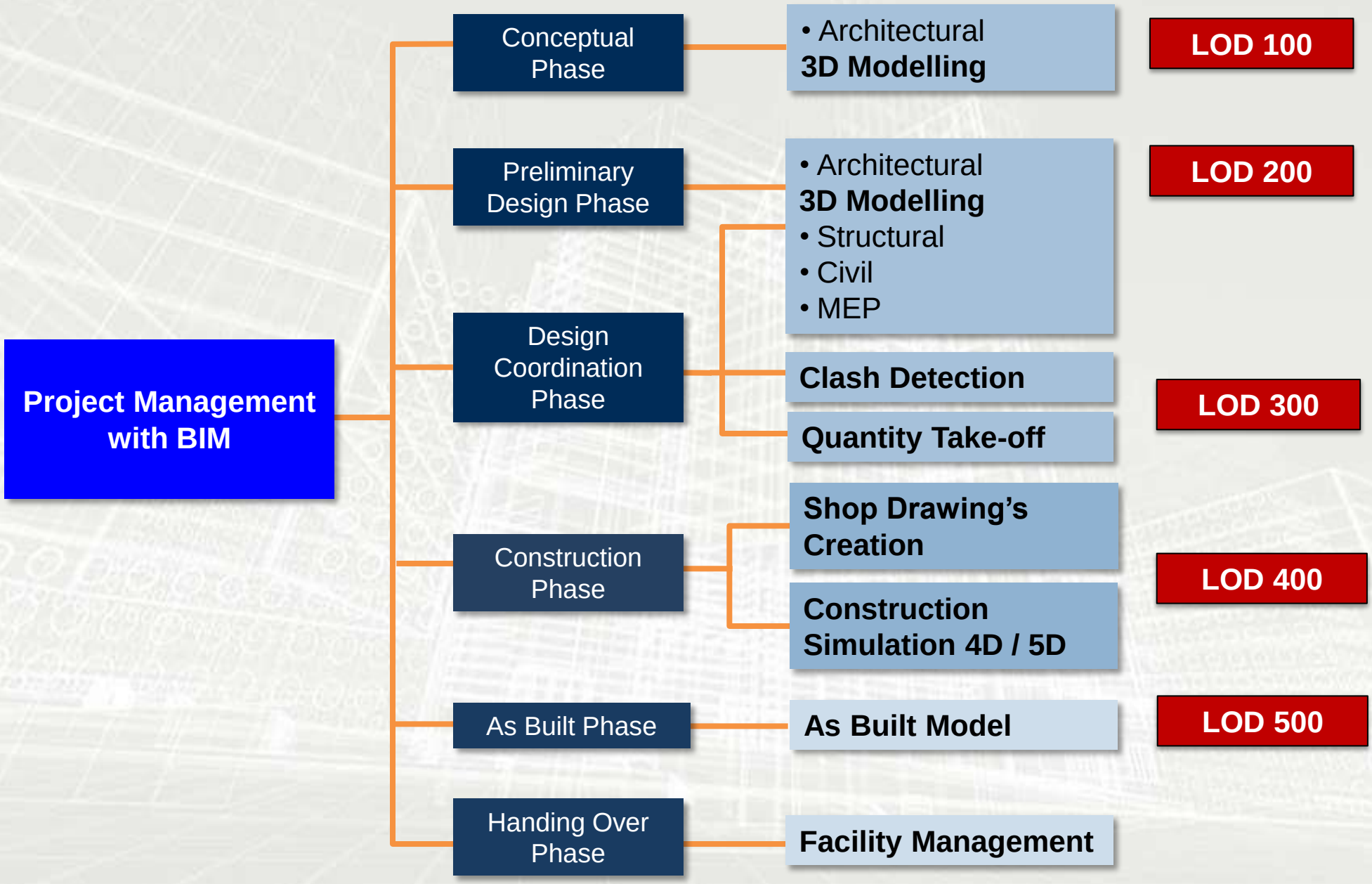


***Source :* Dodge Data & Analytics – Smart Market Report**
Published on 2015 in Associate with Building Smart Alliance

PROJECT FLOWCHART
(Design & Supervision)



BIM PROCESS


Project Management with BIM
Conceptual Phase
• Architectural
3D Modelling
LOD 100
Preliminary Design Phase
• Architectural
3D Modelling
• Structural
• Civil
• MEP
LOD 200
Design Coordination Phase
Clash Detection
Quantity Take-off
LOD 300
Construction Phase
Shop Drawing's Creation
Construction Simulation 4D / 5D
LOD 400
As Built Phase
As Built Model
LOD 500
Handing Over Phase
Facility Management

BIM - IPD

To provide IPD (Integrated Project Delivery) using BIM technology to manage and maintain projects effectively

IPD - BIM Deliverables

- 3D modelling & Outputs
- Clash detection
- Clash Resolution
- Quantity take off
- 2D Extraction
- Construction simulation – 4D & 5D
- Facility Management Solutions

CHALLENGES


CHALLENGES
Education, Training & Support
Legal & Contractual
Delivery Standard & Processes
Institutional Support
Digital Capabilities
Investment

Signature Address in KL

55-storey Hotel & Condominium

- D&B Contract
- Design Simultaneously with Construction
- Foreign Contractor Participation

Challenges

- Collaborative design contribution including from contractor / builders
- Departure from traditional delivery method of isolated responsibilities

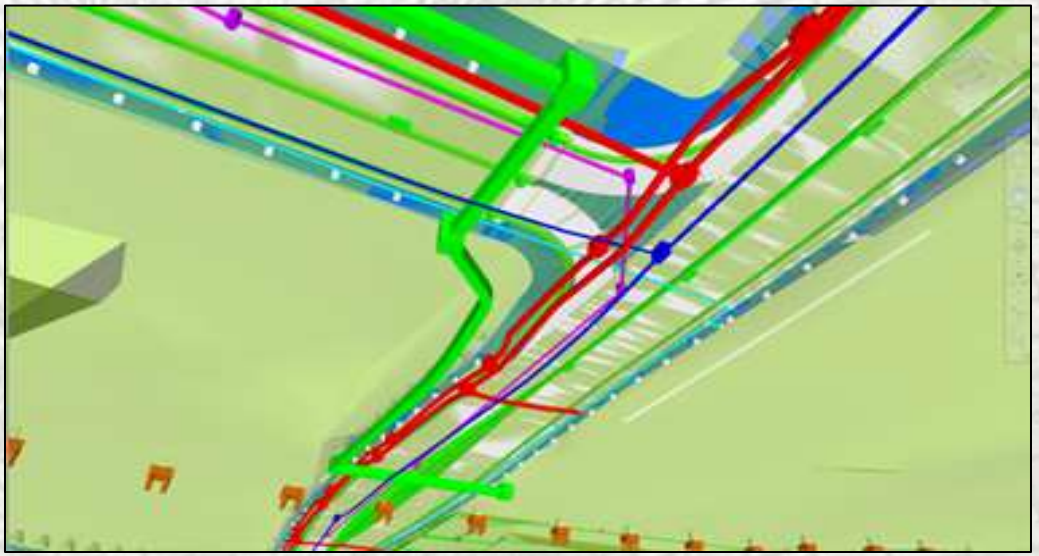
SMART TOWNSHIP

2300 Acre Township in Sungai Buloh

- Conventional Contract
- Modeling of external infrastructure on design completion
- Updating by contractor

Challenges

- BIM was not in initial procurement
- Correct software & Inter-Operability issues
- Quantity measurement (earthwork & contingencies)



HYPERMARKET IN SETAPAK & KAMPAR

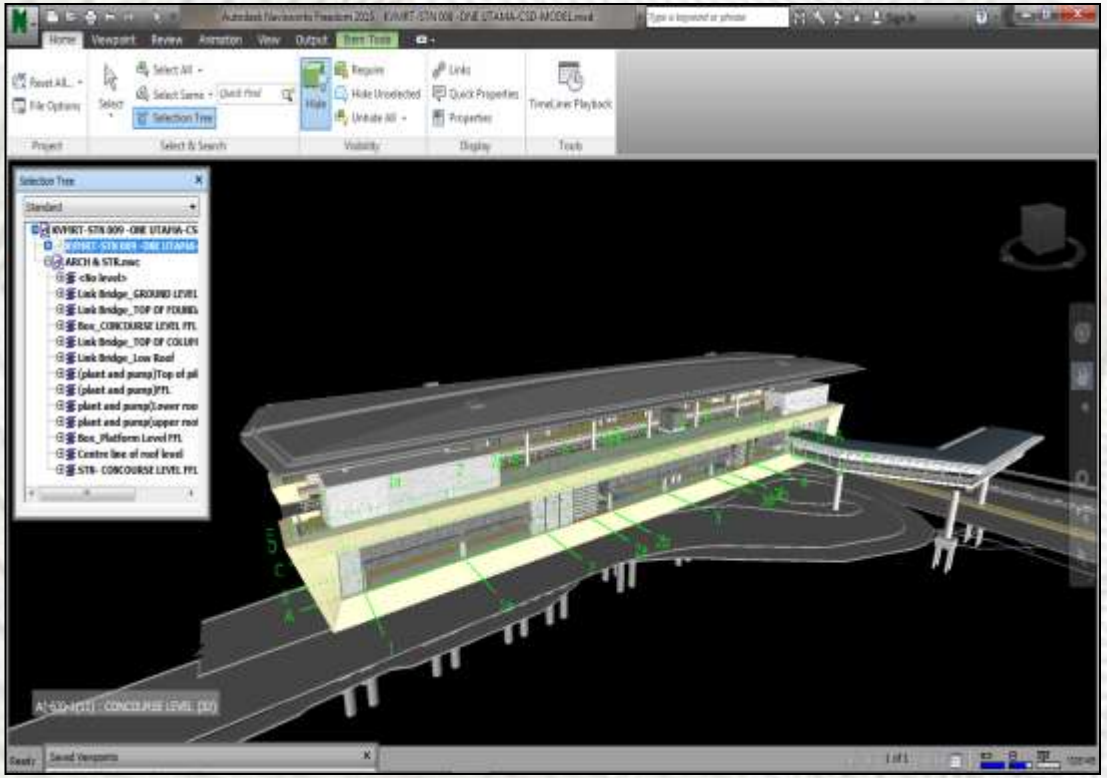
Hypermarkets

- Simple Buildings
- Conventional Contract
- 13,500 sqm & 14,000 sqm.

Challenges

- Collaboration amongst project proponents

Transit Station in Klang Valley



Transit Station in Klang Valley

- 24 Stations
- 1 Depot
- Klang Valley Vicinity

Challenges

- BIM process and deliverables
- Workshop participations
- Time & Schedule

Station Walkthrough Video

HOTEL IN ABU DHABI

Hotel built over F1 Race circuit in Abu Dhabi

- 499 rooms, 75 suites, 7 restaurants
- 85,000 sqm
- Modeling include temporary works

Challenges

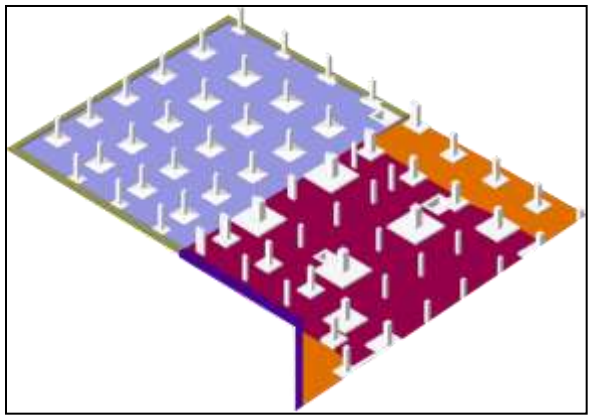
- Modelling temporary structure to achieve cost economy
- Construction simulation to achieve design intent
- Decision Making process

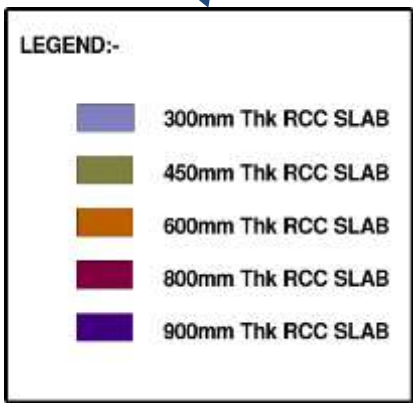
CHALLENGES IN BQ

QUANTITY TAKE-OFF

Raft Slab Concrete Quantities

CROSS REFERENCE BOQ





SCHEDULE OF RAFT SLAB - SECOND BASEMENT BLOCK A

TYPE	TYPE MARK	AREA	VOLUME
600mm-RCC SLAB	RS-600	2309.474 m²	1385.685 m³
800mm-RCC SLAB	RS-800	3181.904 m²	2545.523 m³
900mm-RCC SLAB	RS-900	92.888 m²	83.599 m³
		5584.266 m²	4014.807 m³

SCHEDULE OF RAFT SLAB - SECOND BASEMENT BLOCK B

TYPE	TYPE MARK	AREA	VOLUME
600mm-RCC SLAB	RS-600	3991.480 m²	2394.888 m³
800mm-RCC SLAB	RS-800	3137.848 m²	2510.279 m³
900mm-RCC SLAB	RS-900	83.019 m²	74.718 m³
		7212.348 m²	4979.884 m³

SCHEDULE OF RAFT SLAB - SECOND BASEMENT BLOCK C

TYPE	TYPE MARK	AREA	VOLUME
300mm-RCC SLAB	RS-300	1145.652 m²	343.696 m³
450mm-RCC SLAB	RS-450	107.542 m²	48.394 m³
		1253.194 m²	392.090 m³

CHALLENGES

Legal & Contractual

- Ownership of model
- Design liability / Modelling liability
- Responsibility of design / Modelling
- Integration of BIM with existing contracts
- Professional indemnity
- Commercial rates for BIM Consultants

CHALLENGES

Delivery Standard & Processes

- Protocols to be set on processes
- Clear definition of roles & responsibility
- Deliverables to be defined

PROJECTS WITH BIM

TECHNOLOGY

Modelling technology poised to change construction

Steel Construction

"We had not completely finished modelling each section of the building as we sent the models to the detailer."

BIM improves design process

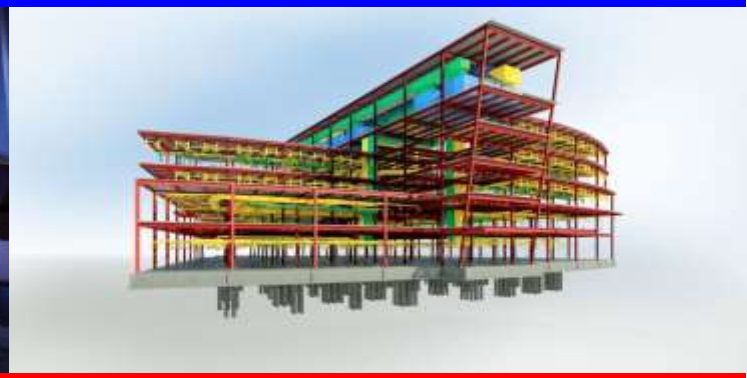
SOFTWARE

BIM helps deliver RAIL PROJECT

Building Information Modelling is playing a key role in Sydney's North West Rail Link. Create looks at how the software is used from conception to decommissioning.

Longest rail tunnel

TERIMA KASIH
THANK YOU

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