A Standard Integrated Project Controls Model for Optimizing Organizations' Processes

By: **Mohamed Hisham**, **MSc, MEng, PMP, PMI-RMP, PMI-SP**

Corporate Project Controls Manager

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Project Controls EXPO
UAE, Middle East

About the Speaker

About the Speaker

EXPERIENCE 16 YEARS

- **Planning & Scheduling**
- **Cost Control**
- **Risk Management**
- **Delay Analysis**
- **4D Modeling**
- **Automated Reporting**
- **PMO Standardization**

EDUCATION

Cairo University – Master of Science (MSc)

Master of Science in Construction Management. Research subject is "Application of Building Information Modeling (BIM) in Infrastructure Bridges".

Nile University – Master of Engineering (MEng)

Master of Engineering in Construction Management. Areas of study include (not limited to): advanced planning and control, asset management, IT applications in construction, and cost management.

Cairo University – Bachelor of Science (BSc)

BSc. of Civil Engineering 2007 "Very Good; honors".

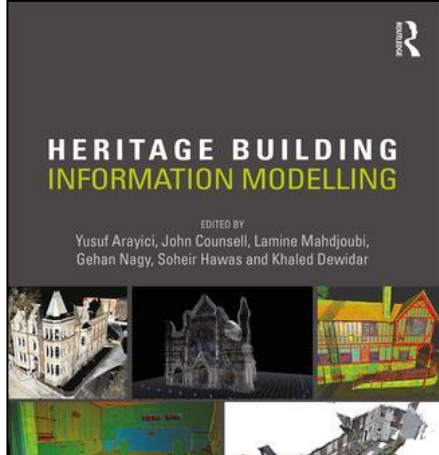## PROFESSIONAL CERTIFICATIONS

PMP – Project Management Professional

PMI-RMP – Risk Management Professional

PMI-SP – Scheduling Professional

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About the Speaker

HERITAGE BUILDING INFORMATION MODELLING

EDITED BY
Yusuf Arayici, John Counsell, Lamine Mahdjoubi,
Gehan Nagy, Soheir Hawas and Khaled Dewidar

Chapter 10 | 19 pages
Planning of sustainable bridges using building information modeling

With Mohamed Marzouk, Mohamed Hisham

Hide abstract ⌃

This chapter presents a framework for using Bridge Information Modeling (BrIM) as an effective tool in the management of existing and heritage. Building Information Modeling (BIM) has been utilized in different applications, such as: cost estimation lean construction facility management sustainable development and construction process documentation. The proposed BrIM management system depends on developing a 3D BrIM model of the heritage or existing bridge then integrating it with the other system modules, which are the database module and the condition assessment module. Information systematized in the database must include general data about each bridge, like the description of the structure and its environment. The developed program then creates a database of the bridge components by writing the extracted information to an MS Excel file. The C# program extracts the intelligent attributes of elements from BrIM and creates a text file that can be used by the ANSYS software package.

Comparative Analysis of Bridges Construction Methods Using Bridge Information Modeling
2019 • International Journal of 3-D Information Modeling (IJ3DIM) 7(3)

See publication

Planning of Sustainable Bridges using Building Information Modelling, Chapter: 10
Feb 2017 • Routledge, UK, Editors: Yusuf Arayici, John Counsell, Lamine Mahdjoubi, Gehan Nagy, Soheir Hawas, Khaled Dewidar, pp.114-132

Implementing earned value management using bridge information modeling
Jun 2014 • KSCE Journal of Civil Engineering 18(5):1302-1313

Modeling Sustainable Building Materials in Saudi Arabia
Jun 2014 • 2014 International Conference on Computing in Civil and Building Engineering

Applications of bridge information modeling in bridges life cycle
Mar 2014 • SMART STRUCTURES AND SYSTEMS 13(3)

A hybrid model for selecting location of mobile cranes in bridge construction projects
Sep 2013 • The Baltic Journal of Road and Bridge Engineering 8(3):184-189

Building Information Model for Selecting Environmental Building Materials
Jan 2013 • The Seventh International Structural Engineering and Construction Conference

Applications of Building Information Modeling in Cost Estimation of Infrastructure Bridges
Jun 2012 • International Journal of 3-D Information Modeling, 1(2), 17-29

Bridge Information Modeling in Sustainable Bridge Management
Jan 2012 • International Conference on Sustainable Design and Construction (ICSDC) 2011

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Contents

Contents

1. Introduction

Purpose & Objective

➢ The purpose of this presentation is to present a standard integrated project controls model that can be utilized to **optimize the organizations' processes**

➢ The presented model helps to **improve productivity** and to **enhance the efficiency of the processes**

➢ The presented model plays a crucial role in **achieving the projects' objectives in the most efficient manner**

Standardization Definition

Standardization describes the establishment of set of procedures and rules that people in the organization should follow to complete specific tasks

Standardization Benefits

If the processes aren't standardized, running a complex business will be a nightmare

Standardization Benefits

Improves Clarity

Improves Productivity

Guarantees Quality

Improves Morale

Shortens Learning Curve

Reduces Conflicts

2. The Proposed Project Controls Model

The Proposed Project Controls Model

The Proposed Project Controls Model Considers Standard Integration of Project

Controls Processes in **2** Dimensions:

➢ **Horizontal** Standard Integration (between project controls dep. & other dep.)

➢ **Vertical** Standard Integration (in the project control dep.)

The Proposed Project Controls Model
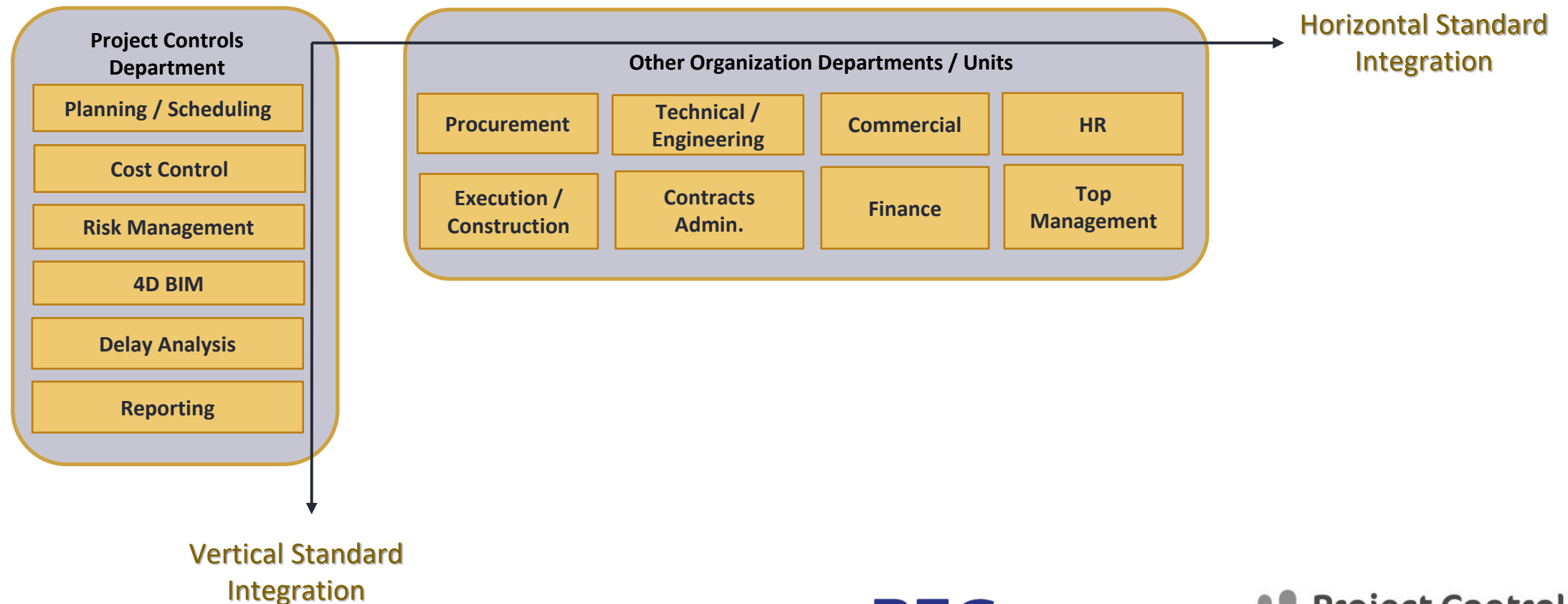
3. Horizontal Standard Integration

Horizontal Standard Integration

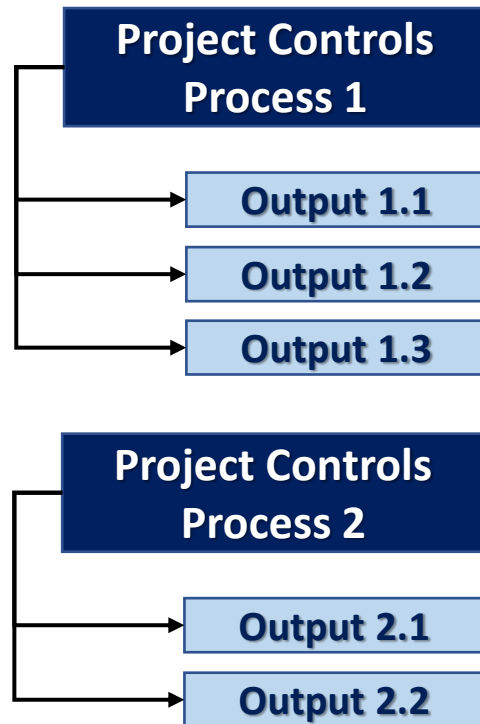Horizontal Standard Integration (Between Project Control Dep. & other Dep.)

➢ Defining the Project Controls Departments Outputs

➢ Defining Other Departments Requirements

➢ Mapping the Project Controls Processes & Outputs with the Other Departments Requirements

This ensures effective & smooth flow of tasks, processes, & outputs between departments & improves productivity
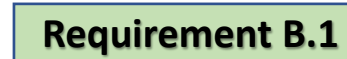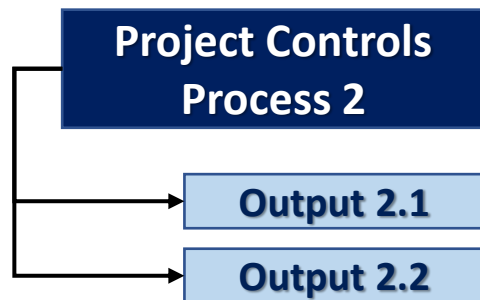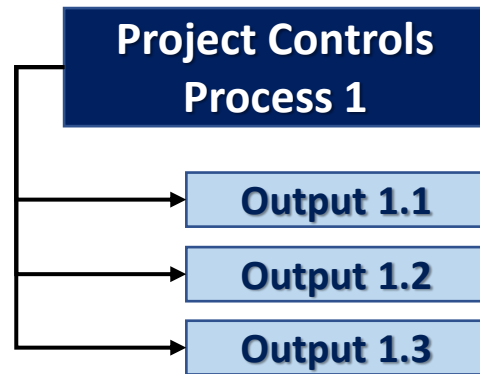
Horizontal Standard Integration

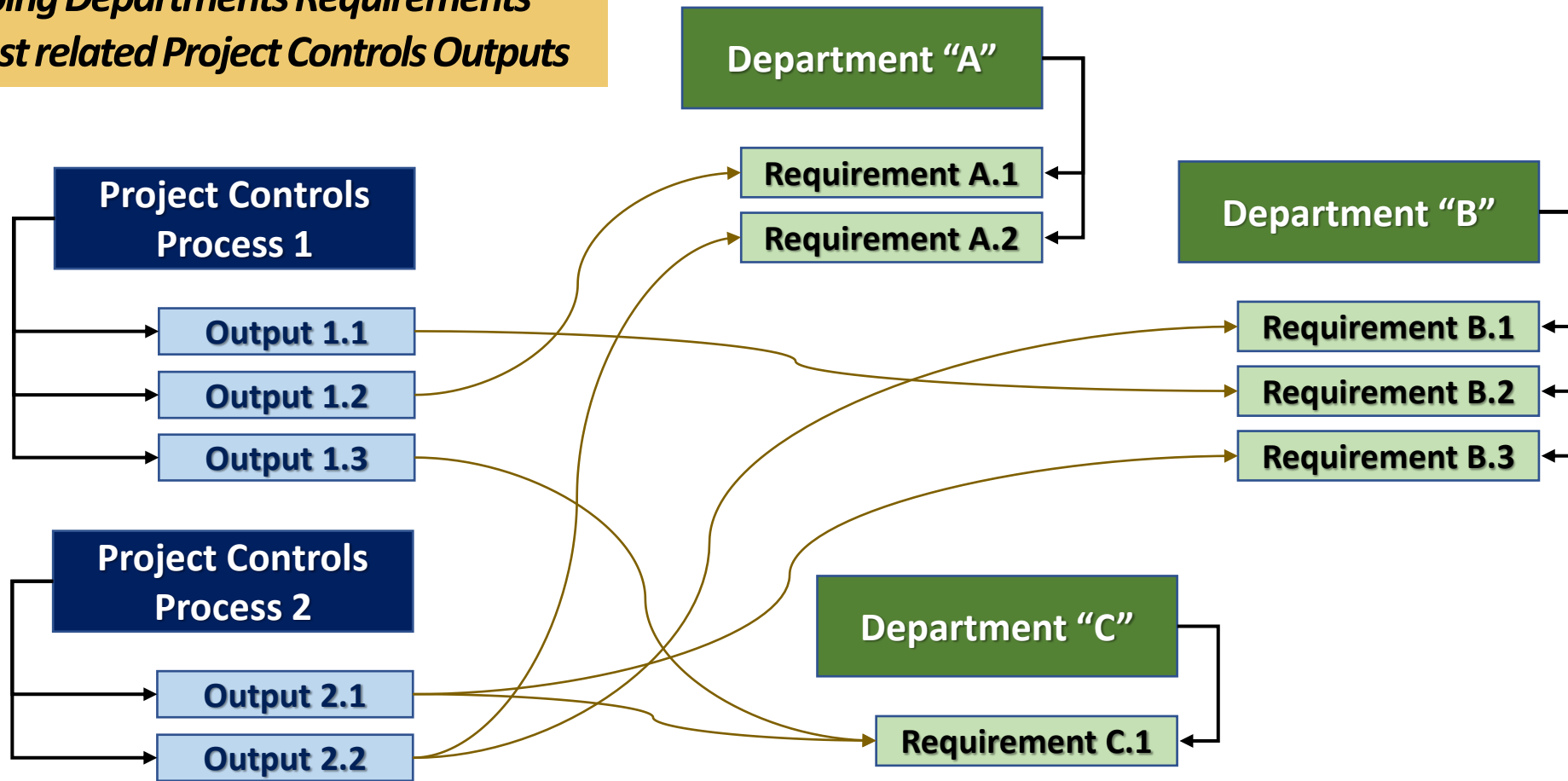**Define project Controls Processes & Outputs**

```
Project Controls
   Process 1
        ├──▶  Output 1.1
        ├──▶  Output 1.2
        └──▶  Output 1.3

Project Controls
   Process 2
        ├──▶  Output 2.1
        └──▶  Output 2.2
```

Horizontal Standard Integration

Define Departments Requirements

Department "A"

Requirement A.1

Requirement A.2

Department "B"

Requirement B.1

Requirement B.2

Requirement B.3

Project Controls Process 1

Output 1.1

Output 1.2

Output 1.3

Project Controls Process 2

Output 2.1

Output 2.2

Department "C"

Requirement C.1

Horizontal Standard Integration

Mapping Departments Requirements against related Project Controls Outputs

Department "A"

Requirement A.1

Requirement A.2

Department "B"

Project Controls Process 1

Output 1.1

Output 1.2

Output 1.3

Requirement B.1

Requirement B.2

Requirement B.3

Project Controls Process 2

Output 2.1

Output 2.2

Department "C"

Requirement C.1

Horizontal Standard Integration

Develop Schedule Baseline

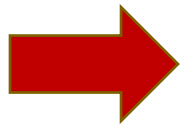## Execution / Construction Dep.

Sequence of Works

Critical Activities / Paths

Work Phasing Strategies

Resources Requirements & utilization

Horizontal Standard Integration

Develop Schedule Baseline

Procurement Dep.

Procurement Plan

Horizontal Standard Integration

Develop Schedule Baseline

HR Dep.

Resource	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24
Rgh Carp.			27	45	49	98	104	89	96	97	113	99	106	100	84	45	34	20
Steel Fixer			13	26	28	72	80	71	82	88	102	79	90	102	72	50	36	21
Labor/Helper	5	6	67	123	131	234	257	210	238	427	789	1068	1047	1086	1013	1108	991	1116
Eq. Operator		5	10	18	17	19	27	15	10	56	56	54	54	31	43	56	20	59
Block Mason									29	47	28	44	43	48	60	34	46	
Finishing Carpenter										37	57	32	50	73	37	73		
Aluminum Installer									3	16	13	12	14	17	19	19		
Tiler									26	56	32	49	40	56	42			
Granite Setter									2	9	10	9	8	24	12	20		
Carpet Setter														0	0	2		
Painter									49	155	133	149	152	118	167	177		
HVAC Technician									1	2	3	5	7	12	8	9	10	10
Electrician					2	5	5	6	12	41	58	72	97	71	94	90	96	
Precast Installer									3	42	40	27	42	24	35	44	15	46
Metals Skilled labor									0	7	8	4	8	10	9	13		
Insulation worker									0	0	0	0	0	0	0			
Steel Structure Installer									2	5	73	3	8	252	5	65		
False Ceiling Installer									27	110	63	78	90	52	109	124		
Plumber				4	5	6	6	12	14	31	48	34	47	38	45	44	58	
Plasterer									50	177	127	136	181	103	144	165	120	
Equipment Installer									2	17	20	15	20	18	13	23		
Fire Fighting Technician								2	5	7	11	10	10	13	13	15		
Duct-man									8	13	21	28	22	29	27	33	25	29
Concrete Mason			3	4	5	9	10	8	9	9	27	42	25	44	36	35	38	29
Total	**5**	**11**	**120**	**216**	**234**	**439**	**489**	**404**	**467**	**844**	**1565**	**2086**	**2098**	**2157**	**1984**	**2340**	**1939**	**2223**

Manpower Requirements by Trade & by Time Interval

Horizontal Standard Integration

Project Controls Processes	Execution / Construction Dep.	Finance Department	Procurement Department	Engineering Department	Contracts Department	Commercial Department	HR Department	Top Management
Develop Schedule Baseline	Activities Sequence Works Phasing Strategies Resource Requirements & Utilization Critical Activities	Planned Cash-in Distribution After Applying Payment Terms	Procurement Plan	Engineering Plan	Baseline schedule as a Base for Progress Measurement and Delay Analysis	Planned Cash-in Distribution After Applying Payment Terms	Manpower Histogram by Trade	Milestone Schedule Critical Requirements
Develop Cost Baseline	Budget limits (Manpower-Equipment)	Planned Cash-out distribution	Budget limits (Materials)	Budget Limits (Service Providers)	Budget limits (Sub-Contracts)	Budget Limits (Service Providers)	Budget Limits (Hiring)	Cash-flow Structured Budget
Monitoring & Controlling	KPIs Variance Analysis Productivity measures Revised budget limits	Revised Cash-flow based on current status	KPIs Variance Analysis Revised budget limits	KPIs Variance Analysis Revised budget limits	Updated schedule as a Base for Delay Analysis Revised budget limits	Identifying gaps between EV & Invoices Revised budget limits	Revised Manpower Histogram Revised budget limits	KPIs Major Variances & Recommended Actions At Completion Values
4D BIM Modeling	Visualizing Construction Sequence Identifying Logistics Challenges				Visualizing impact of delay events	Evaluations of Variation Orders		Visualizing Construction Sequence 4D Status (Planned VS Actual)

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Horizontal Standard Integration

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4D BIM Modeling	Visualizing Construction Sequence Identifying Logistics Challenges				Visualizing impact of delay events	Evaluations of Variation Orders		Visualizing Construction Sequence 4D Status (Planned VS Actual)

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4D BIM Modeling	Visualizing Construction Sequence Identifying Logistics Challenges				Visualizing impact of delay events	Evaluations of Variation Orders		Visualizing Construction Sequence 4D Status (Planned VS Actual)

4. Vertical Standard Integration

Vertical Standard Integration

Vertical Standard Integration (Inside Project Control Dep.)

➢ In the same section / unit of Project Controls Department (Planning section)

To standardize planning & scheduling processes such as schedule development

➢ Between sections / units of Project Controls Department (Planning & Cost Control , etc.)

To standardize criteria, workflows, etc. between the separate sections / units to improve the efficiency of project

controls dep.

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Standardizing Schedule Development

Standard Activity Dictionary
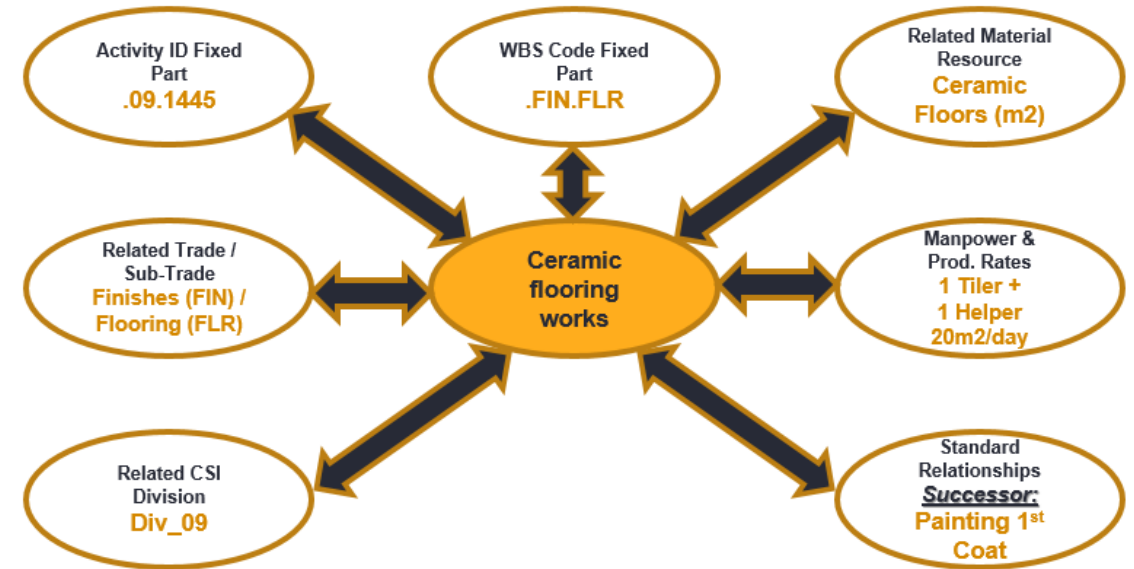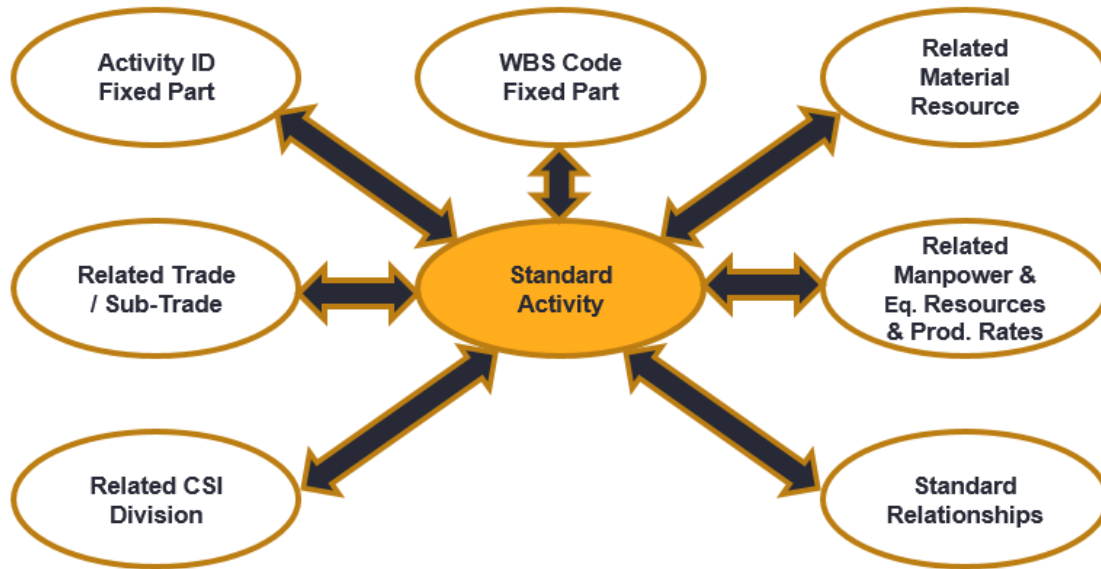
Standardizing Schedule Development

Standard Activity Dictionary

Standard Activity Codes to be assigned to Standard Activity Dictionary

Standrad Code (1)		Standard Code (2)		Standard Code (3)	
Trade	**Trade Code**	**Sub-Trade**	**Sub Trade Code**	**CSI Division**	**CSI Division Code**
Substructure Civil Works	CIV			General Requirements	Div_01
Concrete	CON			Site Construction	Div_02
Finishes	FIN	Flooring	FLR	Concrete	Div_03
Finishes	FIN	Walls & Ceiling	WAL	Masonry	Div_04
Finishes	FIN	Wet Areas	WET	Metals	Div_05
Building General Finishing Works	EXT			Wood & Plastics	Div_06
Doors & Windows	DOR			Thermal & Moisture Protection	Div_07
Furniture & Equipment	FUR			Doors & Windows	Div_08
Roofing System	ROS			Finishes	Div_09
Roof Finishes	FIN			Specialities	Div_10
Elevator	ELV			Equipment	Div_11
Substructure MEP Works	MEP			Furnishing	Div_12
Mechanical	MEC	Drainage	DRA	Special Construction	Div_13
Mechanical	MEC	Water Supply	WSU	Conveying Systems	Div_14
Mechanical	MEC	Fire Fighting Works	FIR	Mechanical	Div_15
Mechanical	MEC	HVAC Works	HVC	Electrical	Div_16
Electrical	ELE	First Fix Works	FX1		
Electrical	ELE	Second Fix Works	FX2		
Electrical	ELE	Third Fix Works	FX3		

Standardizing Schedule Development

Standard Activity Dictionary

Standard Resources Dictionary
& Rates to be assigned to
Standard Activity Dictionary

Manpower	
Resource Name	**Res. ID**
Labor/Helper	LBR
Eq. Operator	EQO
Rgh Carp.	RCP
Steel Fixer	STF
Concrete Mason	COM
Precast Installer	PRI

Equipment	
Resource Name	**Res. ID**
Excavator	EXV
Loader	LDR
Mini-Loader	MLD
Compactor	CMP
Truck	TRU
Grader	GRD

Material	
Resource Name	**Res. ID**
Excavation (m3)	EXC
Anti-Termite (m2)	ANT
Backfilling (m3)	BFL
Gravel (m2)	GRV
Interlock (m3)	INL
Plain Concrete (m3)	PLC

Standardizing Schedule Development

Standard Activity Dictionary

Activity Name & ID Structure

Div.	Activity Name	ID Serial	Activity ID Fixed Part
02	Excavation Works	1000	02.1000
02	Anti-Termite Works	1005	02.1005
02	Structure backfilling under foundation level	1010	02.1010
02	Backfilling around foundation & neck columns	1015	02.1015
02	Backfilling around grade beams	1020	02.1020
02	Gravel layer works	1025	02.1025
02	Interlock Concrete Pavers	1030	02.1030
02	Agricultural Soil Works	1035	02.1035
03	Plain Concrete Works	1040	03.1040
03	RC Foundation Works	1045	03.1045
03	RC Raft Foundation Works	1050	03.1050

Activity Codes

CSI Division Code	Trade	Trade Code
Div_02	Substructure Civil Works	CIV
Div_02	Substructure Civil Works	CIV
Div_02	Substructure Civil Works	CIV
Div_02	Substructure Civil Works	CIV
Div_02	Substructure Civil Works	CIV
Div_02	Substructure Civil Works	CIV
Div_02	Building General Finishing Works	EXT
Div_02	Building General Finishing Works	EXT
Div_03	Substructure Civil Works	CIV
Div_03	Substructure Civil Works	CIV
Div_03	Substructure Civil Works	CIV

Resources

Reference Quantity (for calculation)	Unit	Labor/Helper	Eq. Operator	Rgh Carp.	Steel Fixer
300	m3	1	4.00		
225	m2	1			
400	m3	1	4.00		
45	m3	1	2.00		
45	m3	1	2.00		
200	m2	1			
52	m2	1			
25	m3	1			
7	m3	1		1.00	
3.00	m3	2		1.00	1.00
40.00	m3	4		1.00	8.00

Standard Name & ID Structure

Standard Coding

Standard Rates & Resource Allocation

Standardizing Schedule Development

Standard Activity Dictionary

The benefits of having a Standard Activity Dictionary include:

➢ Reducing time & effort needed to develop the schedule

➢ Automating the schedule development & reduce errors

➢ Having standard Activity ID structure for same activity in different zones, locations

➢ Having standard naming of activities (no typos)

➢ Working easily on Enterprise level (several projects)

➢ Easiness of modifications and adjustments when needed

➢ Easiness of filtering and reporting

Standardizing Schedule Development

Mapping Schedule Activities with BOQ items

Creating Mapping sheets is concerned with the development of excel sheets which link the BOQ items with the schedule activities
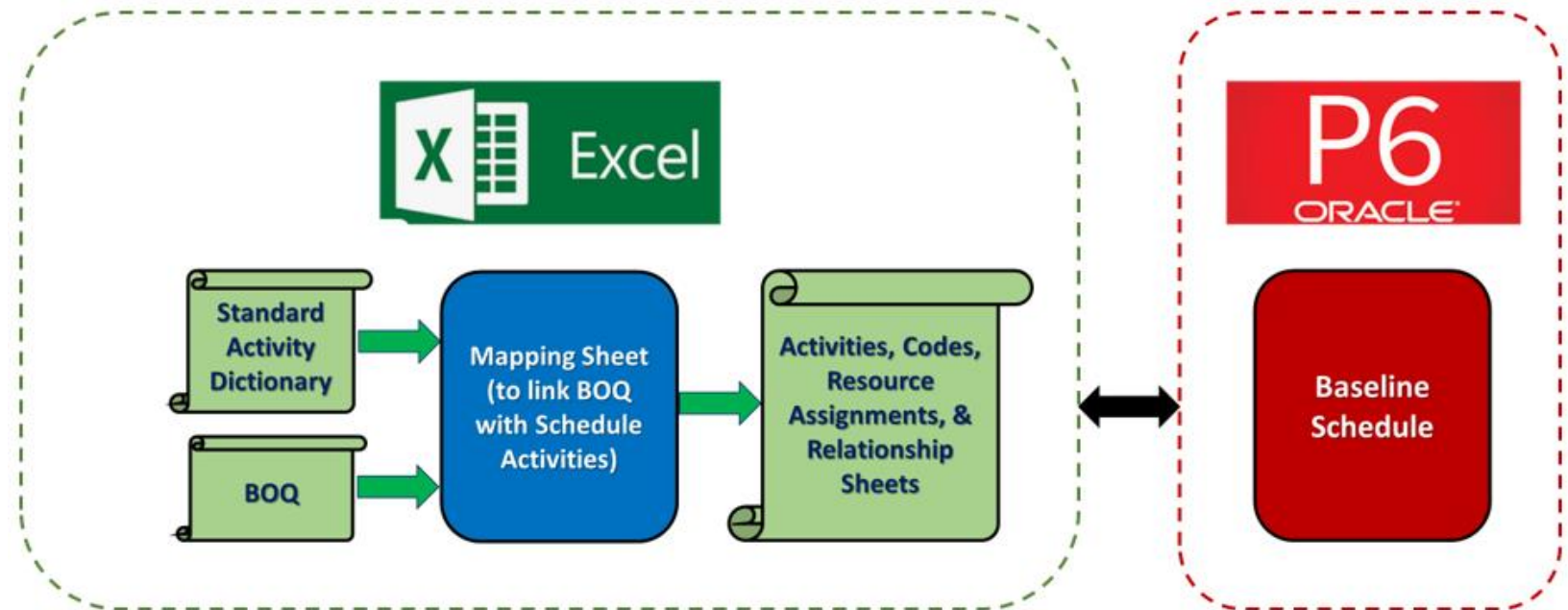
Standardizing Schedule Development

Relationships between Schedule Activities & BOQ Items

One to One
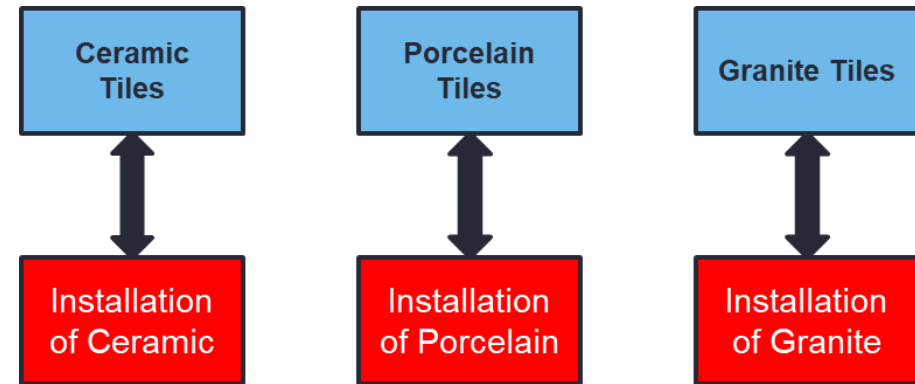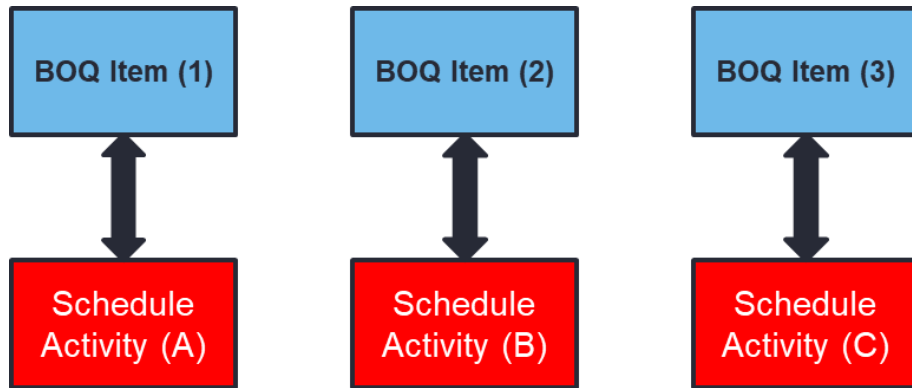
Standardizing Schedule Development

Relationships between Schedule Activities & BOQ Items

One to Many
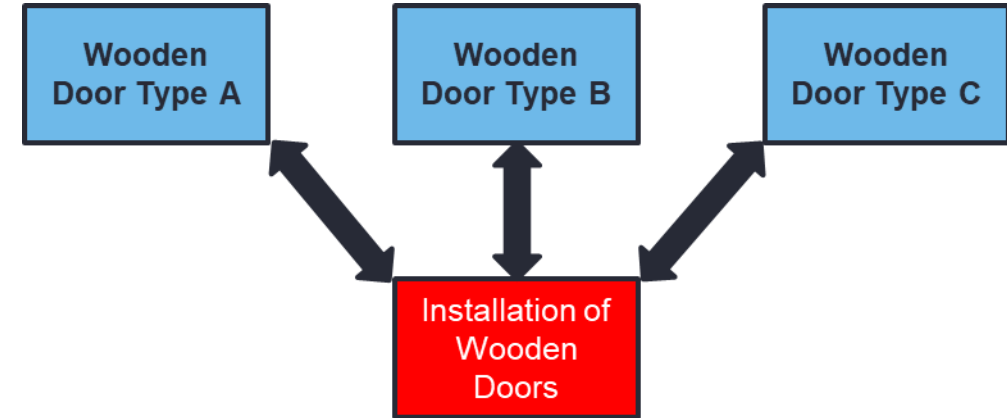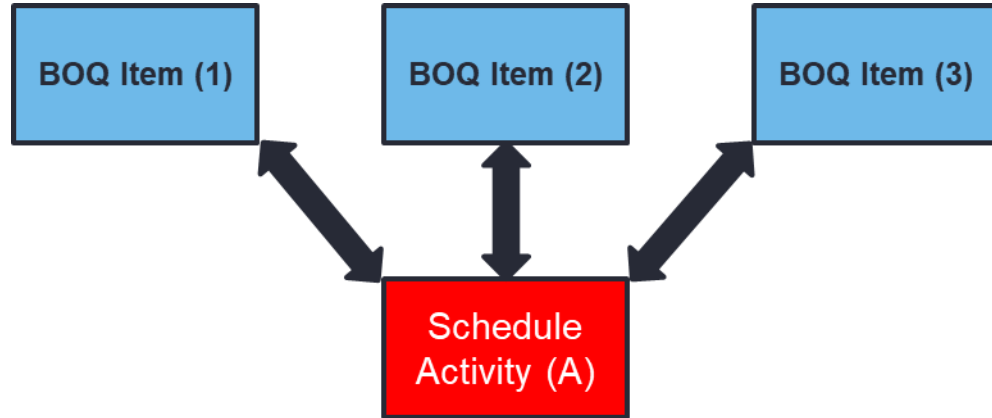
Standardizing Schedule Development

Relationships between Schedule Activities & BOQ Items

Many to One
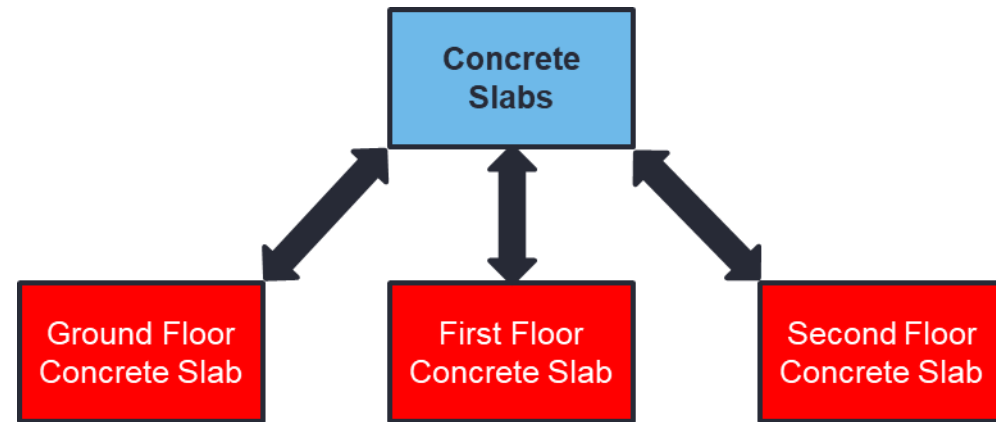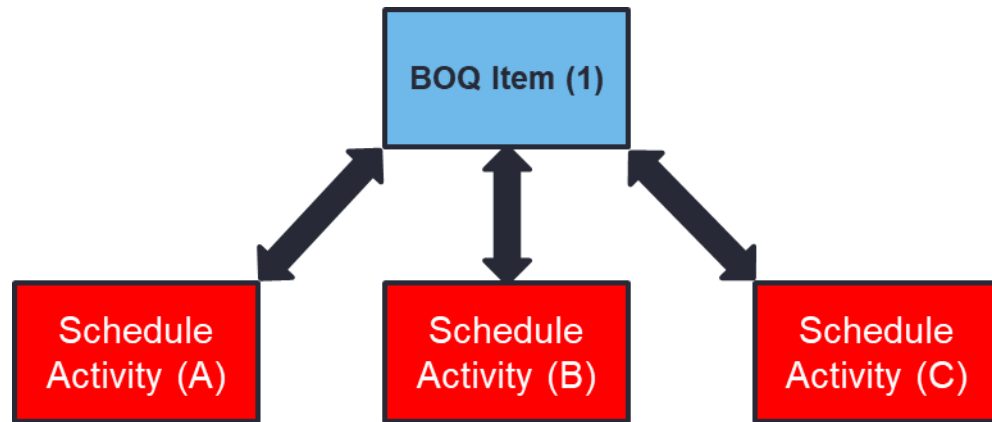
Standardizing Schedule Development

Relationships between Schedule Activities & BOQ Items

Many to Many

Standardizing Schedule Development

Mapping Sheet

BOQ Data · **Activity ID, Name, WBS Code, Activity Codes** · **Cost & Quantity** · **Manpower & Equipment**

Standardizing Schedule Development

Mapping Schedule Activities with BOQ items

The benefits of having mapping sheets:

➢ Realistic representation of scope of work (ensure that all activities are within the project scope)

➢ Accurate allocation and assignment of cost and quantities (cost and quantity are assigned to the activity considering defined weights)

➢ Accurate manpower and equipment assignment (the quantity assigned to the activity is used to calculate the required man-hours for execution when integrated with the standard productivity rates)

Standardizing Schedule Development

Mapping Schedule Activities with BOQ items

The benefits of having mapping sheets (Cont.):

➢ Easy and auto adjustments and modifications to the schedule parameters (when the quantities or the rates are revised, the related assignments are modified)

➢ Integration with cost control & invoices (by rolling up data to BOQ level or control level, CPI can be calculated and also the unbilled amounts can be defined)

➢ Dealing with large amount of data / activities easily and in systematic manner (following specific procedures and clear sheets)

Standardizing Schedule Development

Generated files for P6 Import

Activities & Codes

Act ID	Activity Name	WBS Code	Original Duration	Division	Building	Floor	Trade	Sub-trade
B01.SS.02.1000	Excavation Works	P01.B01.SS.CIV	8	DIV_02	B01	SS	CIV	
B01.SS.02.1015	Backfilling around foundation & neck columns	P01.B01.SS.CIV	12	DIV_02	B01	SS	CIV	
B01.SS.02.1025	Gravel layer works	P01.B01.SS.CIV	2	DIV_02	B01	SS	CIV	
B01.SS.02.1005	Anti-Termite Works	P01.B01.SS.CIV	1	DIV_02	B01	SS	CIV	
B01.SS.03.1040	Plain Concrete Works	P01.B01.SS.CIV	8	DIV_03	B01	SS	CIV	
B01.SS.03.1065	PC under slab on grade	P01.B01.SS.CIV	4	DIV_03	B01	SS	CIV	
B01.SS.03.1045	RC Foundation Works	P01.B01.SS.CIV	16	DIV_03	B01	SS	CIV	
B01.SS.03.1060	Grade Beams Works	P01.B01.SS.CIV	12	DIV_03	B01	SS	CIV	
B01.SS.03.1055	RC Column Necks & Walls	P01.B01.SS.CIV	12	DIV_03	B01	SS	CIV	
B01.GF.03.1075	RC Column Works	P01.B01.GF.CON	16	DIV_03	B01	GF	CON	
B01.FF.03.1075	RC Column Works	P01.B01.FF.CON	16	DIV_03	B01	FF	CON	
B01.RF.03.1075	RC Column Works	P01.B01.RF.CON	16	DIV_03	B01	RF	CON	
B01.SS.03.1160	RC of Enterrance Stair	P01.B01.SS.CIV	6	DIV_03	B01	SS	CIV	
B01.SS.03.1070	RC slab on grade works	P01.B01.SS.CIV	12	DIV_03	B01	SS	CIV	
B01.GF.03.1085	Concrete Slab Works	P01.B01.GF.CON	20	DIV_03	B01	GF	CON	
B01.FF.03.1085	Concrete Slab Works	P01.B01.FF.CON	20	DIV_03	B01	FF	CON	
B01.RF.03.1085	Concrete Slab Works	P01.B01.RF.CON	20	DIV_03	B01	RF	CON	
B01.GF.03.1155	Lintels Works (precast)	P01.B01.GF.FIN.WAL	4	DIV_03	B01	GF	FIN	WAL
B01.FF.03.1155	Lintels Works (precast)	P01.B01.FF.FIN.WAL	4	DIV_03	B01	FF	FIN	WAL

Resource Assignment

Act ID	Resource ID	Budgeted Unit
B01.SS.02.1000	LBR	13.20
B01.SS.02.1000	EQO	52.80
B01.SS.02.1000	EXV	13.20
B01.SS.02.1000	LDR	13.20
B01.SS.02.1000	TRU	26.40
B01.SS.02.1015	LBR	94.04
B01.SS.02.1015	EQO	188.09
B01.SS.02.1015	MLD	94.04
B01.SS.02.1015	TRU	94.04
B01.SS.02.1025	LBR	36.80
B01.SS.02.1005	LBR	38.44
B01.SS.03.1040	LBR	46.86
B01.SS.03.1040	RCP	46.86
B01.SS.03.1040	COM	4.69

Relationships

Pred ID (St)	Pred Name	Succ ID (St)	Succ Name	Rel Type	Lag	Pred ID	Succ ID	Pred Check	Succ Check
02.1000	Excavation Works	02.1005	Anti-Termite Works	FS	0	B01.SS.02.1000	B01.SS.02.1005	B01.SS.02.1000	B01.SS.02.1005
02.1015	Backfilling around foundation & neck columns	03.1060	Grade Beams Works	FS	0	B01.SS.02.1015	B01.SS.03.1060	B01.SS.02.1015	B01.SS.03.1060
02.1025	Gravel layer works	07.1305	Polyethelene Sheets Works below slab on grade	FS	0	B01.SS.02.1025	B01.SS.07.1305	B01.SS.02.1025	B01.SS.07.1305
03.1040	Plain Concrete Works	03.1045	RC Footing Works	FS	0	B01.SS.03.1040	B01.SS.03.1045	B01.SS.03.1040	B01.SS.03.1045
03.1045	RC Footing Works	03.1055	RC Column Necks & Walls	FS	0	B01.SS.03.1045	B01.SS.03.1055	B01.SS.03.1045	B01.SS.03.1055
03.1055	RC Column Necks & Walls	07.1310	Waterproofing for foundations & column necks	FS	0	B01.SS.03.1055	B01.SS.07.1310	B01.SS.03.1055	B01.SS.07.1310
03.1055	RC Column Necks & Walls	16.2220	Earthing system-cables from RC elements to outside building	SS	2	B01.SS.03.1055	B01.SS.16.2220	B01.SS.03.1055	B01.SS.16.2220
03.1060	Grade Beams Works	15.1705	MEP Sleeves in Grade Beams	SS	2	B01.SS.03.1060	B01.SS.15.1705	B01.SS.03.1060	B01.SS.15.1705
03.1065	PC under slab on grade	03.1070	RC slab on grade works	FS	0	B01.SS.03.1065	B01.SS.03.1070	B01.SS.03.1065	B01.SS.03.1070
07.1305	Polyethelene Sheets Works below slab on grade	03.1065	PC under slab on grade	FS	0	B01.SS.07.1305	B01.SS.03.1065	B01.SS.07.1305	B01.SS.03.1065
07.1310	Waterproofing for foundations & column necks	02.1015	Backfilling around foundation & neck columns	FS	0	B01.SS.07.1310	B01.SS.02.1015	B01.SS.07.1310	B01.SS.02.1015
16.2220	Earthing system-cables from RC elements to outside building	07.1310	Waterproofing for foundations & column necks	FS	0	B01.SS.16.2220	B01.SS.07.1310	B01.SS.16.2220	B01.SS.07.1310
02.1005	Anti-Termite Works	03.1040	Plain Concrete Works	FS	0	B01.SS.02.1005	B01.SS.03.1040	B01.SS.02.1005	B01.SS.03.1040
03.1060	Grade Beams Works	15.1715	MEP works under slab on Grade	FS	0	B01.SS.03.1060	B01.SS.15.1715	B01.SS.03.1060	B01.SS.15.1715
15.1715	MEP works under slab on Grade	02.1025	Gravel layer works	FS	0	B01.SS.15.1715	B01.SS.02.1025	B01.SS.15.1715	B01.SS.02.1025
03.1070	RC slab on grade works	03.1160	RC of Enterrance Stair	FS	0	B01.SS.03.1070	B01.SS.03.1160	B01.SS.03.1070	B01.SS.03.1160
15.1705	MEP Sleeves in Grade Beams	15.1715	MEP works under slab on Grade	FS	0	B01.SS.15.1705	B01.SS.15.1715	B01.SS.15.1705	B01.SS.15.1715
03.1075	RC Column Works	03.1085	Concrete Slab Works	FS	0	B01.GF.03.1075	B01.GF.03.1085	B01.GF.03.1075	B01.GF.03.1085

Standardizing Schedule Development

Resource Loaded Schedule Assigned with Codes

Vertical Standard Integration

Between Planning & Cost Control Sections / Units

This ensures having accurate

reporting & calculations of Earned

Value, Cost Performance Index, &

Estimate At Completion

Cost Control Section	⟷	Planning / Scheduling Section
Budget Defined by Cost Element (WBS & Cost Codes)	→	Loaded as Activity Codes & Resources Assignment
EV (Budget), CPI, EAC	←	Progress % of Completion
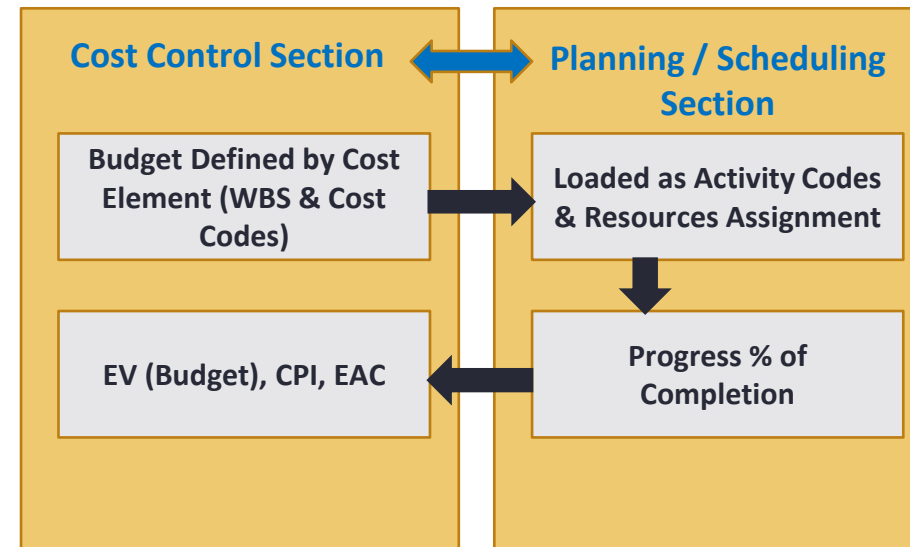
Defining the Common Level of Control

Vertical Standard Integration

Between Planning & Cost Control Sections / Units

- Use Activity Codes when the relation between the cost elements and the schedule activities is one to one

- Use Resource Assignments when the relation between the cost elements and the schedule activities is many to one

5. Standard Operating Procedures (SOPs)

Standard Operating Procedures (SOPs)

Definition & Function

➢ A procedure specific to operation that describes the activities necessary to complete tasks in accordance with industry regulations, or even just your own standards

➢ A document that provides step-by-step instructions on how to perform a particular business activity

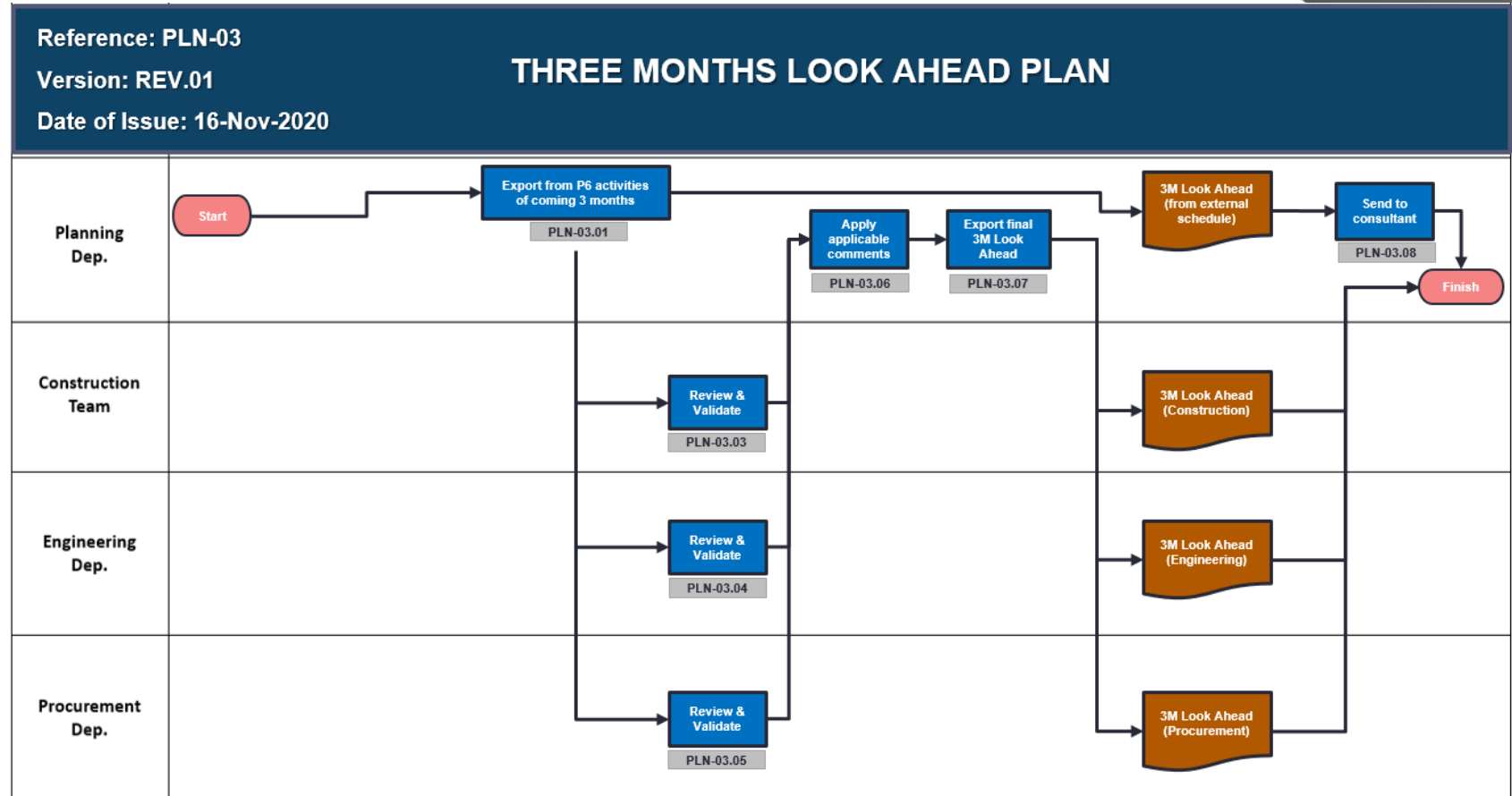➢ It is better to be represented by Flow-Charts
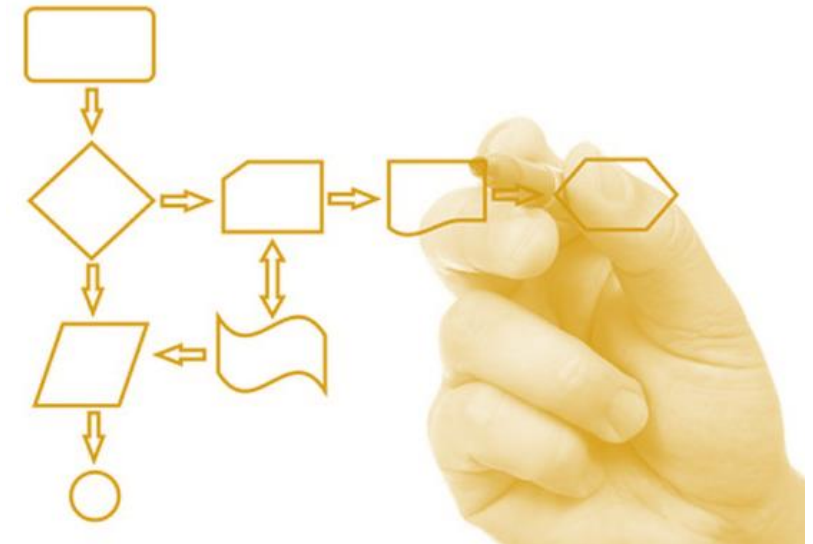
Standard Operating Procedures (SOPs)

The presented Horizontal & Vertical Integrations can be presented in Standard Operating Procedures (SOPs)
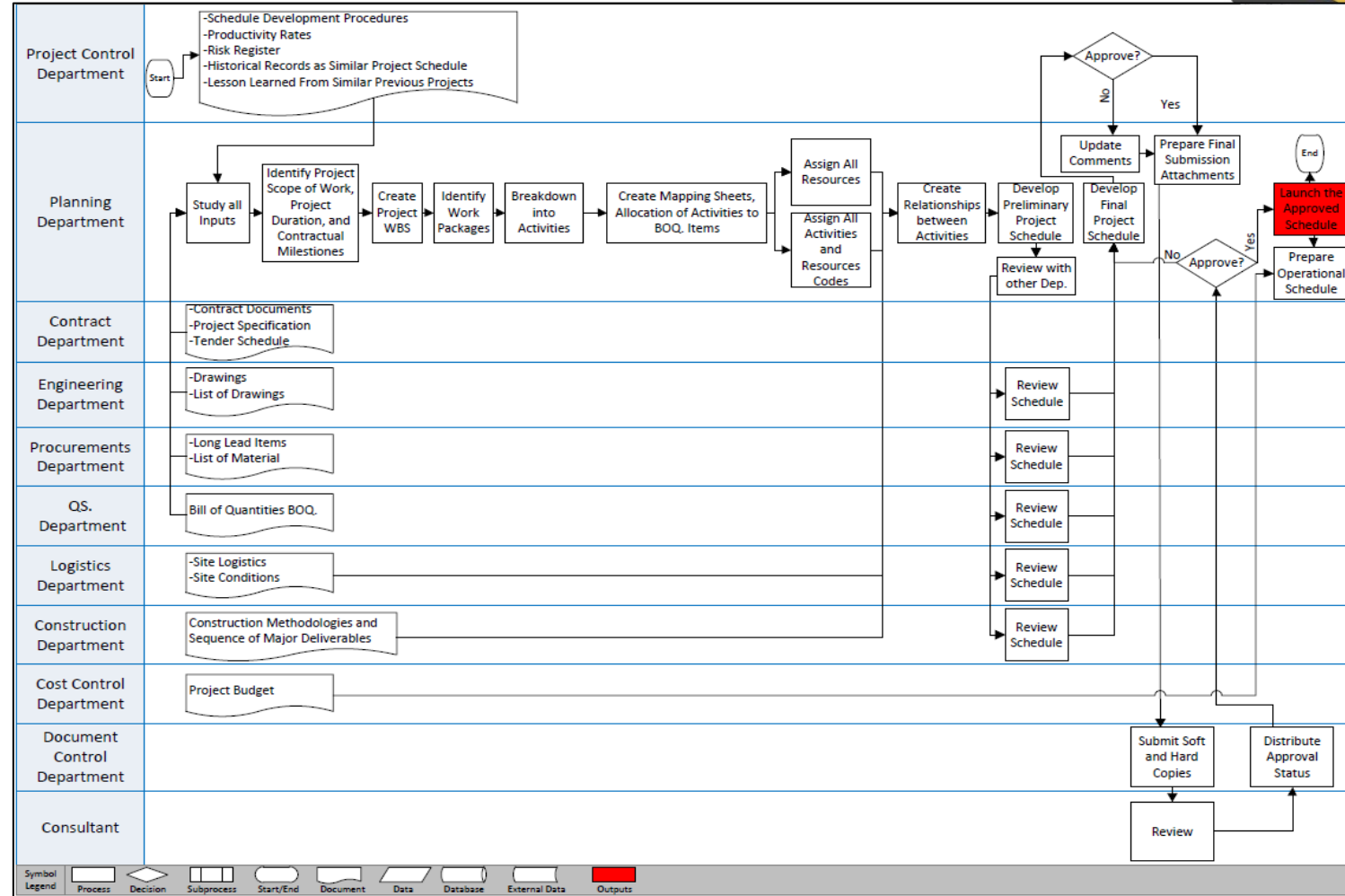
Standard Operating Procedures (SOPs)

The presented Horizontal & Vertical Integrations can be presented in Standard Operating Procedures (SOPs)

6. BIM – Application Programming Interface (API)

BIM – Application Programming Interface (API)

Role of BIM API

➢ BIM API is proposed to enhance the function of the standard integrated project controls model

➢ It expands current BIM uses by adding more properties, features, and applying customized operations via programming languages to achieve the required project controls functions
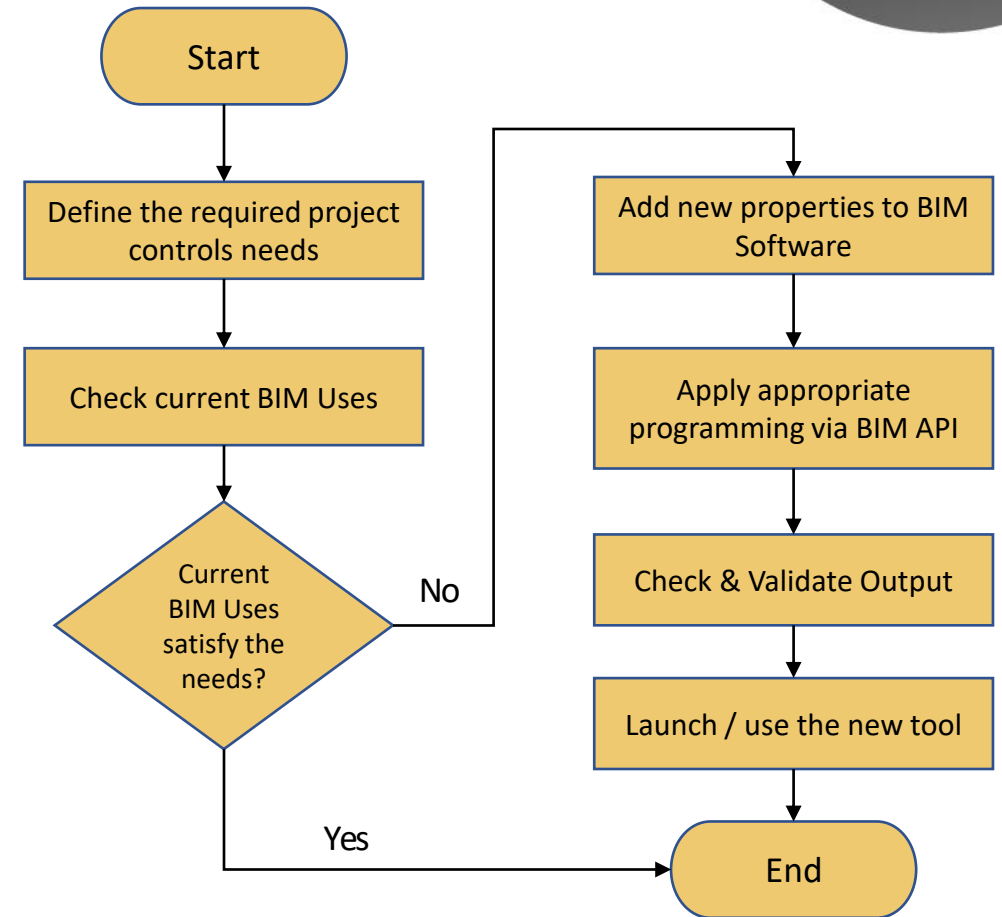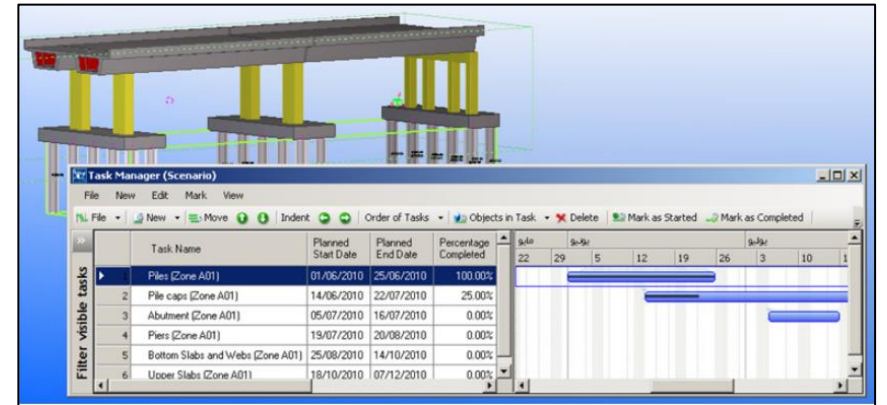
BIM – Application Programming Interface (API)

Utilizing BIM API for Automated

Earned Value Calculations &

Analysis using C# Programming

Language

BEC العربية ARABIA

Project Controls EXPO
UAE, Middle East

7. Summary & Conclusion

Summary & Conclusion

➢ This presentation presents a standard integrated project controls model that demonstrates the interaction between project controls department functions and the functions of other departments in the organization in order to optimize the organizations' processes.

➢ The standardization is presented in two dimensions, which are: horizontal standardization, and vertical standardization. The horizontal standardization focuses on the interaction of project controls functions with other departments, while the vertical standardization focuses on standardizing the processes vertically in the project controls department.

Summary & Conclusion

➢ The vertical standardization of the schedule development is presented in details with practical implementation to demonstrate the benefit of standardization in the integrated model. An example of integration between planning and cost control sections is also presented.

➢ Expanding the uses of Building Information Modeling (BIM) via Application Programming Interface (API) is also presented to enhance the function of the integrated model with more advanced techniques.

Development & utilization of a standard integrated project controls model will improve the efficiency of the organizations' processes

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THANK YOU

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