



فرآیند یکپارچه زمان بندی، برنامه ریزی

کنترل پروژه

بخش دوم



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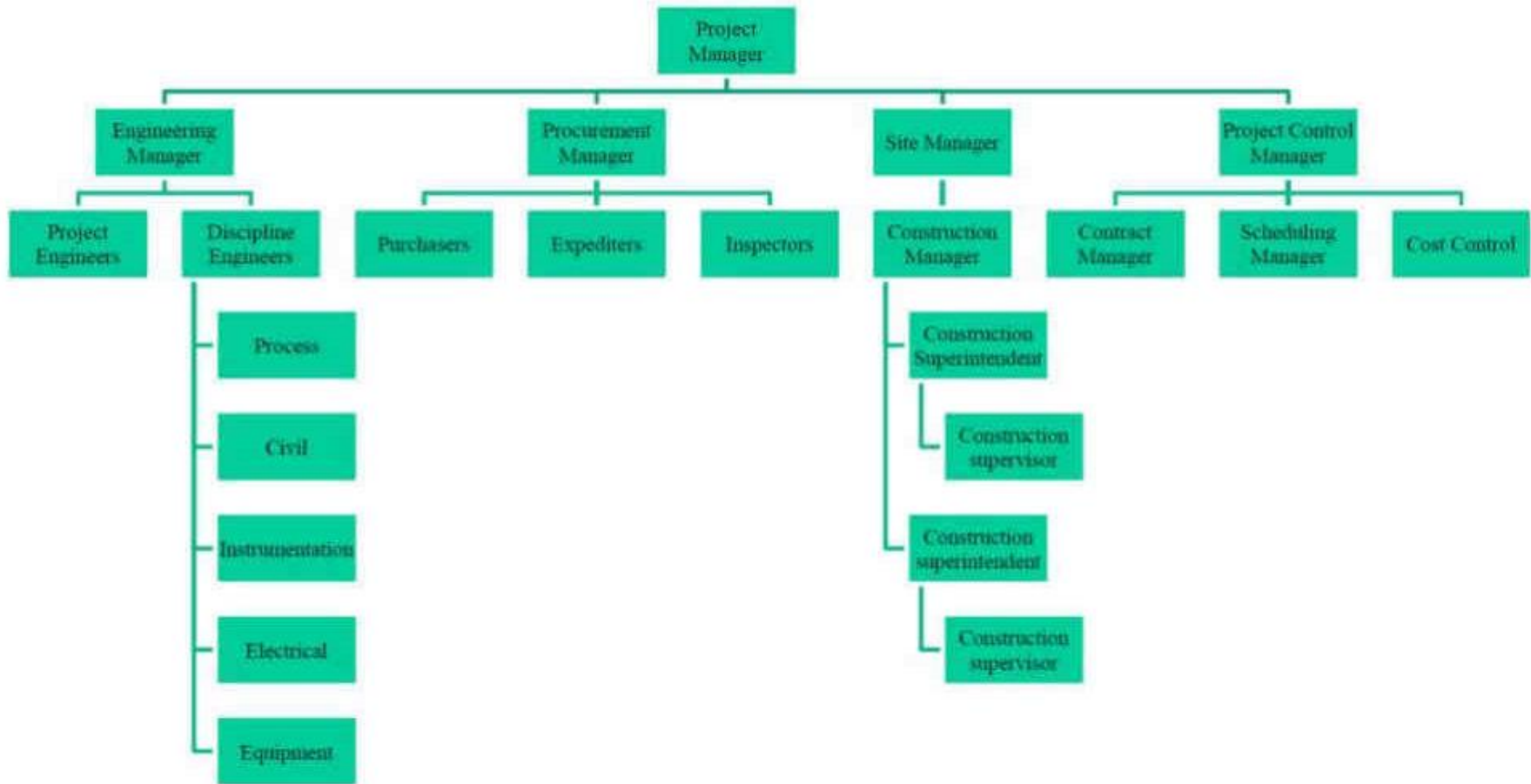
مدرس : مسعود امینی

EPC Project Interdependency and Work Flow

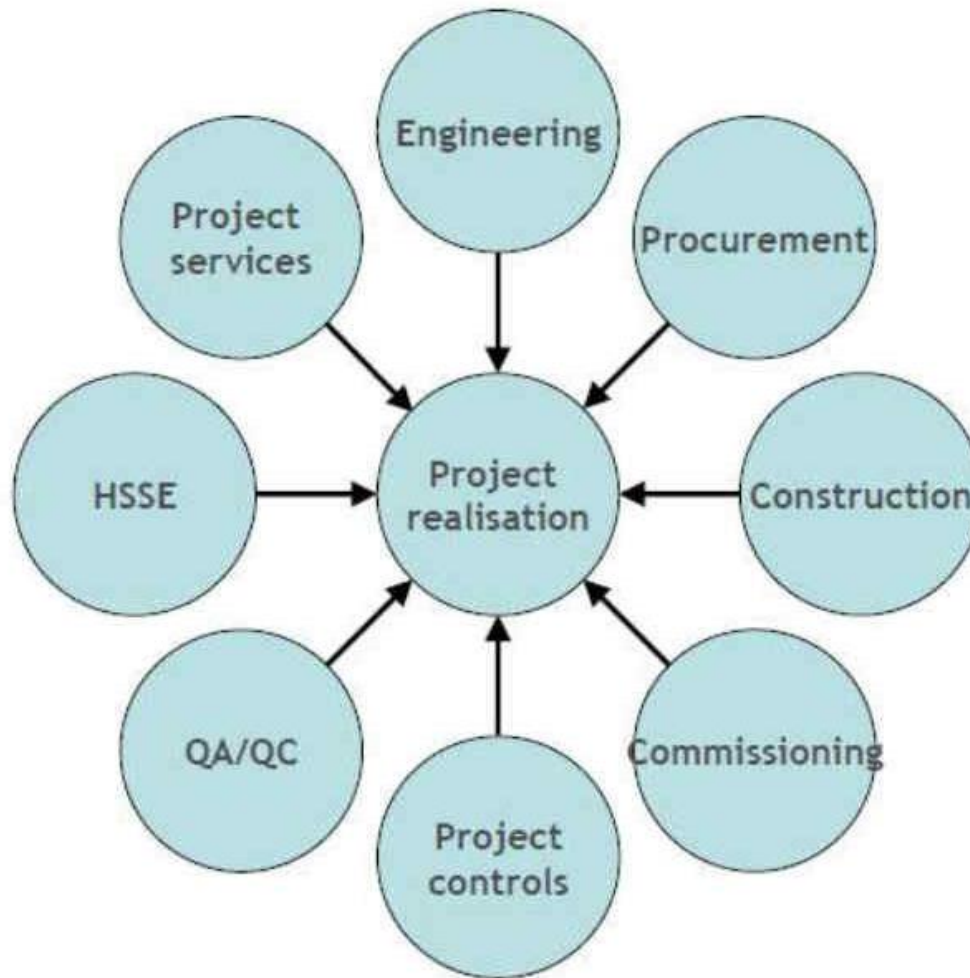
EPC Project management

Introduction

EPC Project Organization



EPC Project Organization



EPC Project Organization



Engineering in the Project



Design basis:

- Functional requirements
- Client specifications
- Design codes

Engineering

Documents for Construction:

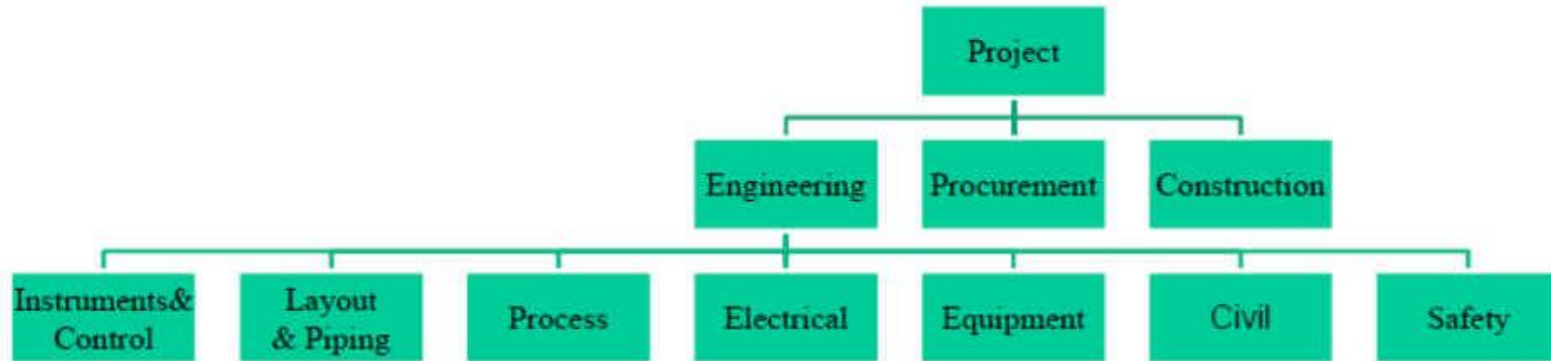
Construction drawings & specifications

Documents for Purchase:

bill of quantity & specification

1. LIST OF MATERIALS			
ITEM	QUANTITY	TAG N°	DESIGNATION
1	5	TC100/TC200 TC300/TC400 TC500/TC600	TURBO COMPRESSORS
2	1		SET OF START-UP & COMMISSIONING SPARE PARTS FOR ITEM1
3	1		SET OF SPECIAL TOOLS FOR ITEM1
4	1		SET OF 2 YEARS SPARE PARTS

Engineering Discipline



EPC Project Management

– Work Flow

Engineering Work Flow

- ❑ Engineering work flow concept is required to be fully understand for someone who involved in the EPC Planning and Activity Sequencing.
- ❑ This concept is applied when the EPC level 4 schedule is developed.
- ❑ The process of engineering work to produce the required deliverable depends on not only within the functional discipline itself but also among the process, mechanical and piping engineering functions.
- ❑ Engineering in EPC project is the task of translating a set of functional requirement into a full set of drawings and specifications depicting every detail of a facility.

Engineering Work Flow

❑ Engineering involves varieties of specialties, which include:

- Process
- Civil and Structure
- Mechanical
- Piping
- Electrical
- Instrumentation
- General Engineering
- Safety

Engineering Work Flow

- ❑ There are many interdependencies between engineering documents.
- ❑ For instance piping drawings are issued after the process diagram is defined.
- ❑ Most of the documents will usually issued several times, at different stages to for review as well as to incorporate the comments.
- ❑ Typically a document is first Issued For internal Review (IFR) of the other disciplines, then to client for Comment (IFC), it will be returned to be incorporated with the client comments and issue for Approval (IFA), then for construction (IFC) and last once everything is confirmed and will Approve for Construction (AFC)

The entire strategy is dependent on Engineering and Procurement providing their deliverables to meet Path of Construction.

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Contractor mobilizes based on Engineering forecast of IFC EWP (Engineering Work Packages).



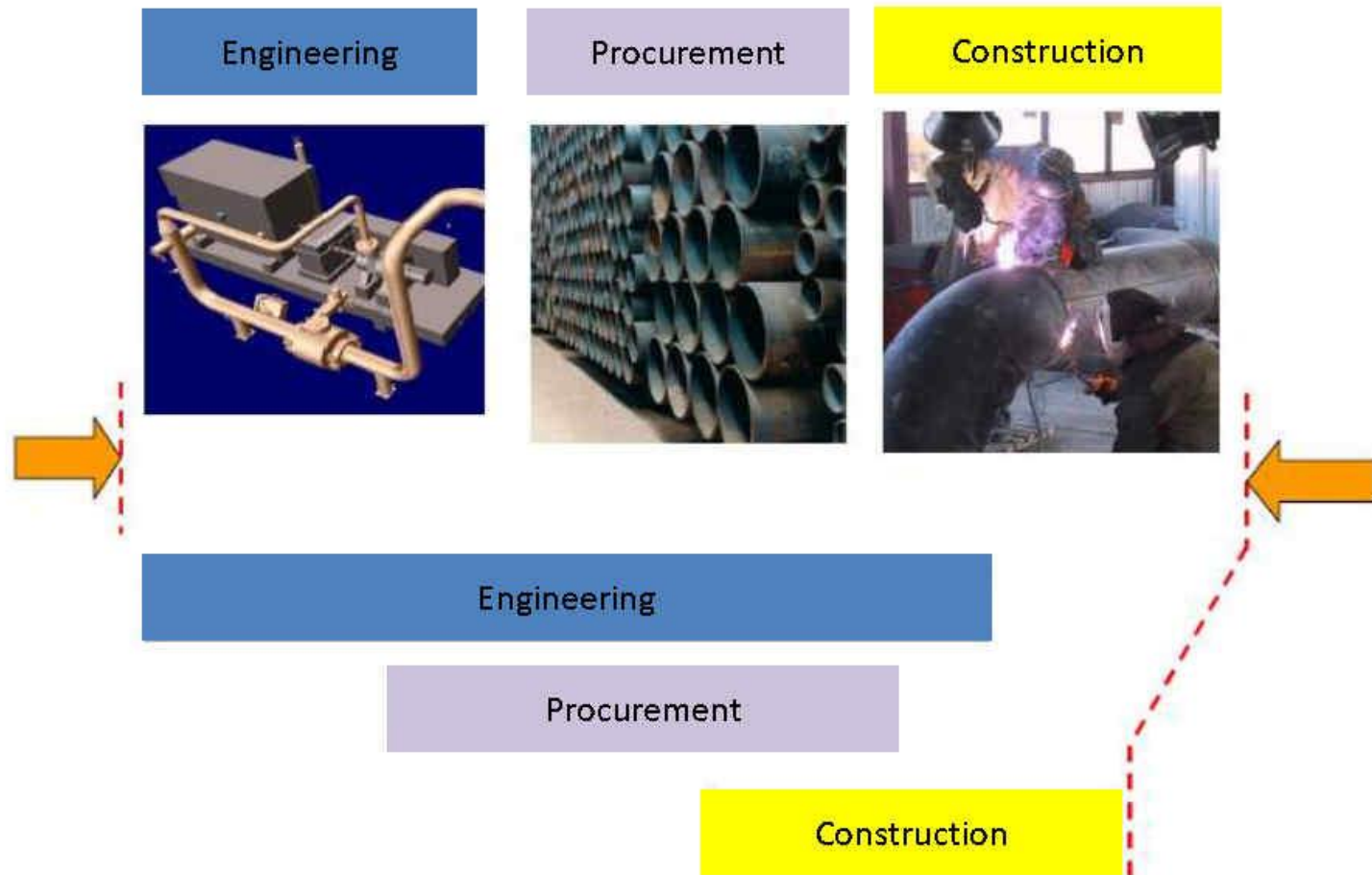
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Engineering phase is very much concerned with documentation.

	Engineering Disciplines					
Activity	Process	Civil and Structure	Mechanical	Piping	Electrical	Instrumentation
Diagrams	✓				✓	✓
Geographical Drawing		✓		✓	✓	✓
Architecture Drawing					✓	✓
Calculations	✓	✓	✓	✓	✓	
Equipment or material spec, data sheet & requisition			✓	✓	✓	✓
Site work spec		✓		✓	✓	✓

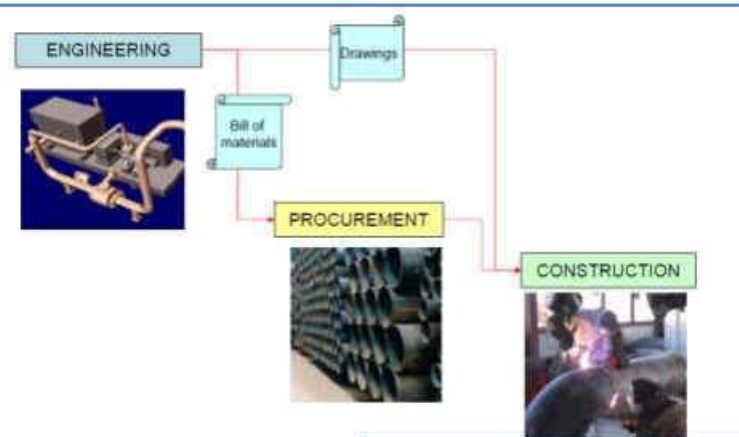
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From Sequential To Concurrent Execution

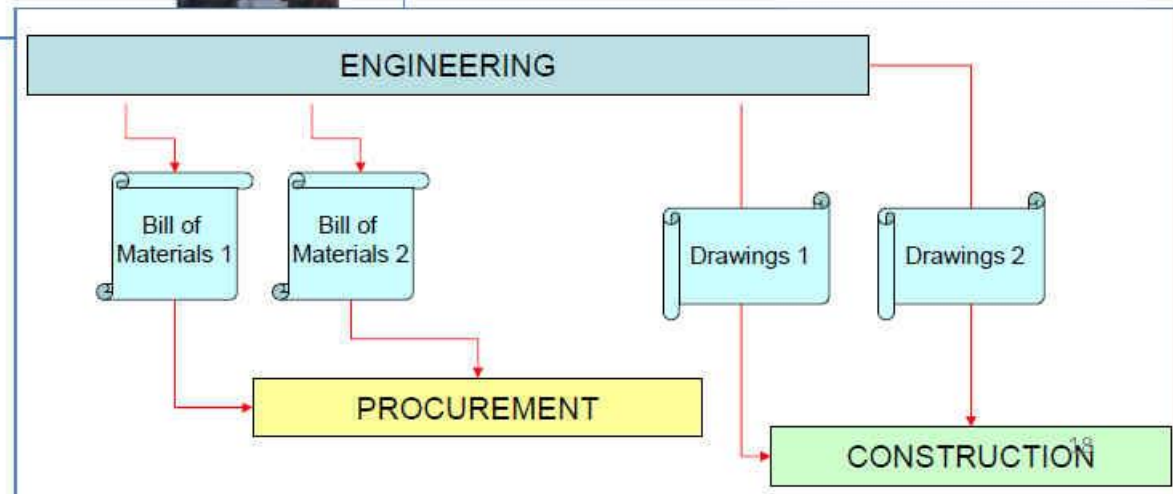


Project Execution

The Past: **sequential execution**



The Present: **concurrent execution**



EPC Project Management

- Engineering Documents Issue Purposes

Issuing Purpose

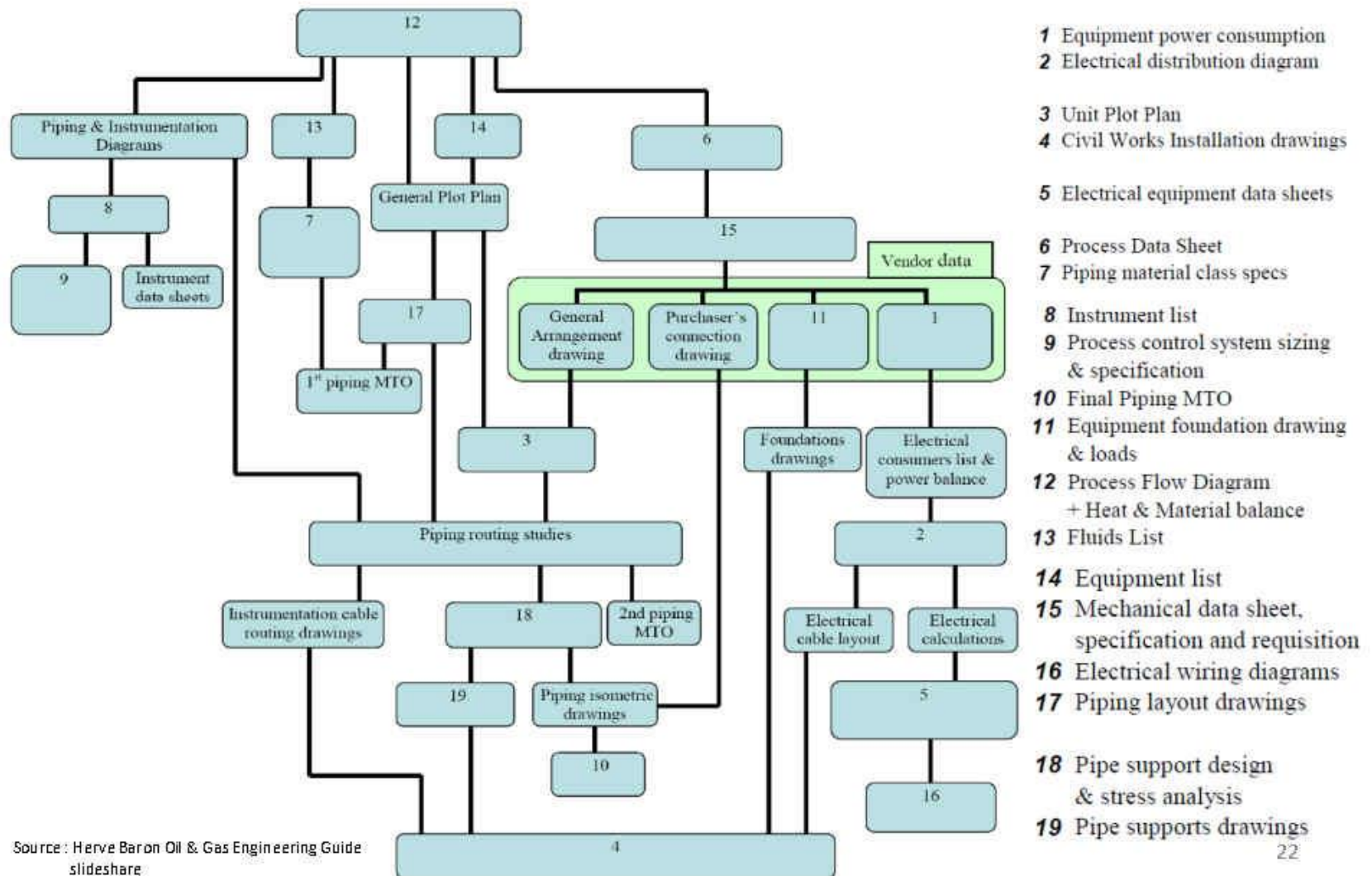
FYI	For Your Information
IAB	Issued For As-Built
ICR	Issued For Construction Record
IFA	Issued For Approval
IFB	Issued For Bid
IFC	Issued For Construction
IFD	Issued For Design
IFE	Issued For Estimate
IFH	Issued For Hazop
IFP	Issued For Purchase
IFR	Issued For Review
IFS	Issued For Squad Check
IFU	Issued For Use
IFV	Issued For Void
RLM	Red Line Mark-up
RTS	Return To Supplier
SFR	Supplier Issued For Review
SFS	Supplier Issued For Squad Check
AFC	Approved for Construction



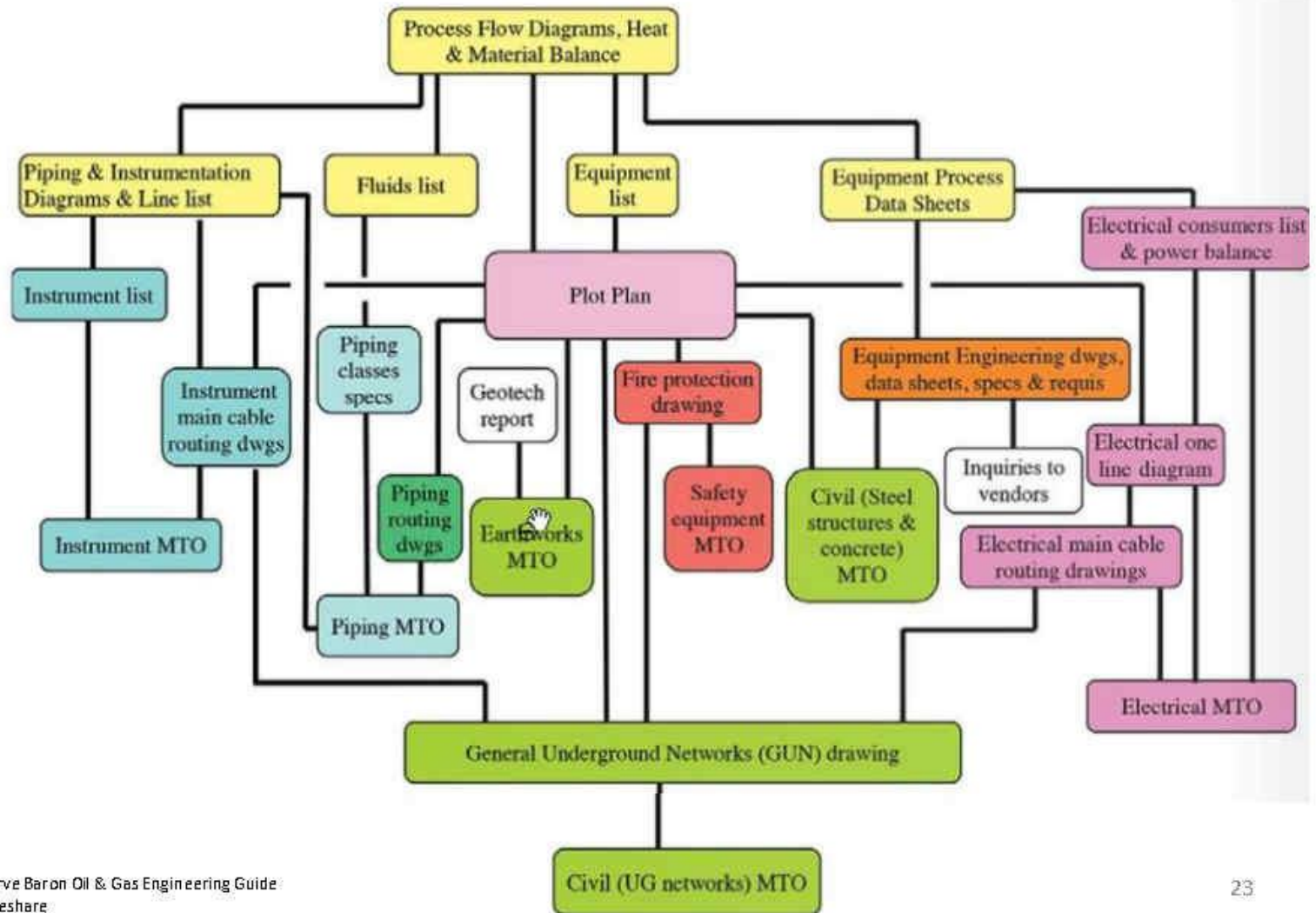
EPC Project Management

– Work Flow

Engineering Workflow



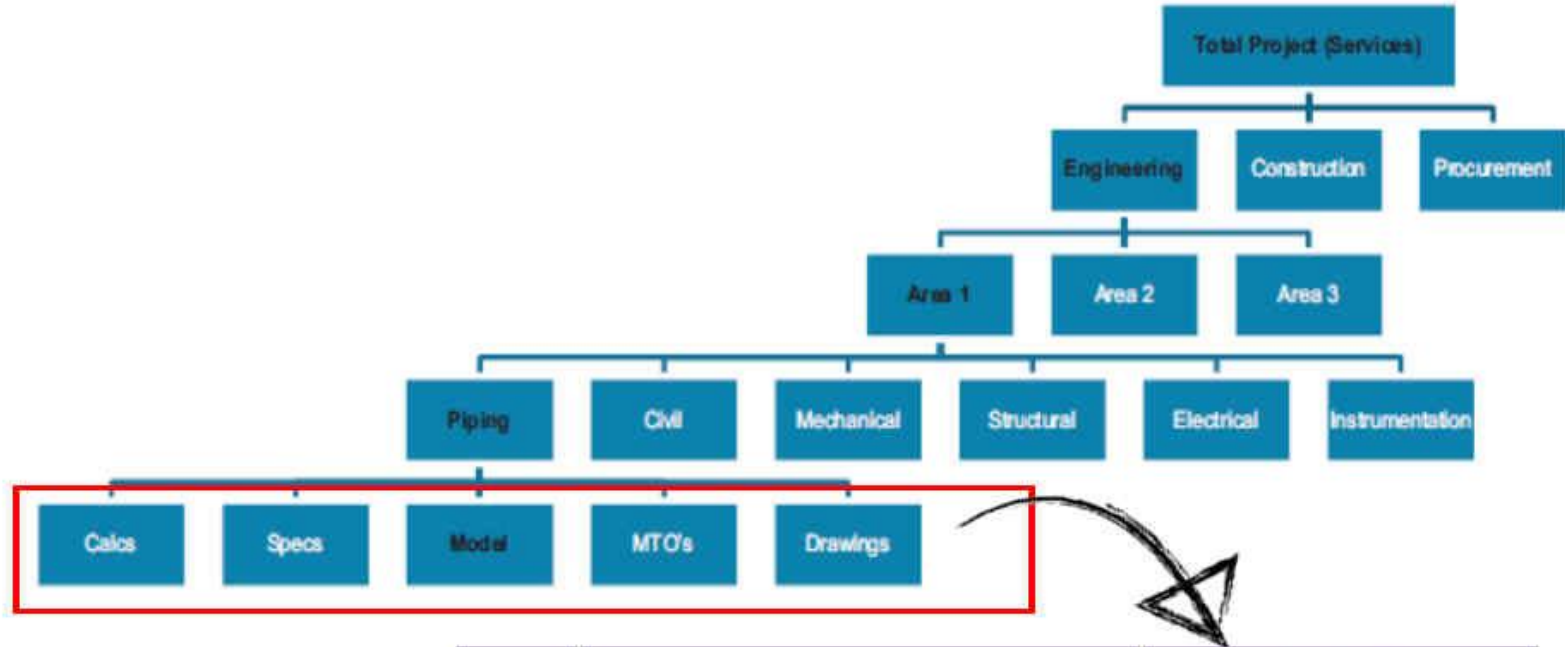
Engineering Workflow



Source : Herve Baron Oil & Gas Engineering Guide
slideshare

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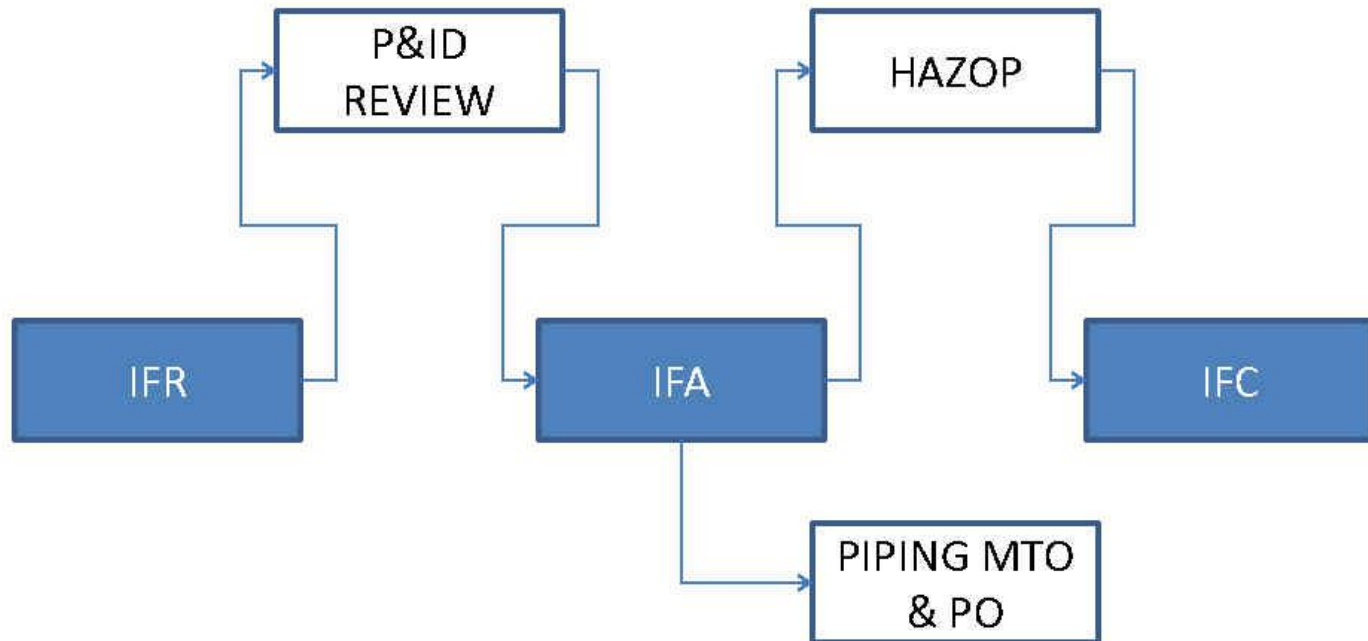
Engineering Document Review Cycle



Step	Review cycle	Rule of credit	
		Increment %	Cumulative %
1	Study and design preparation	5%	5%
2	Issue for review (IFR)	10%	15%
3	Issue for approval (IFA)	20%	35%
4	Issue for construction (IFC)	30%	65%
5	Approved for construction	35%	100%

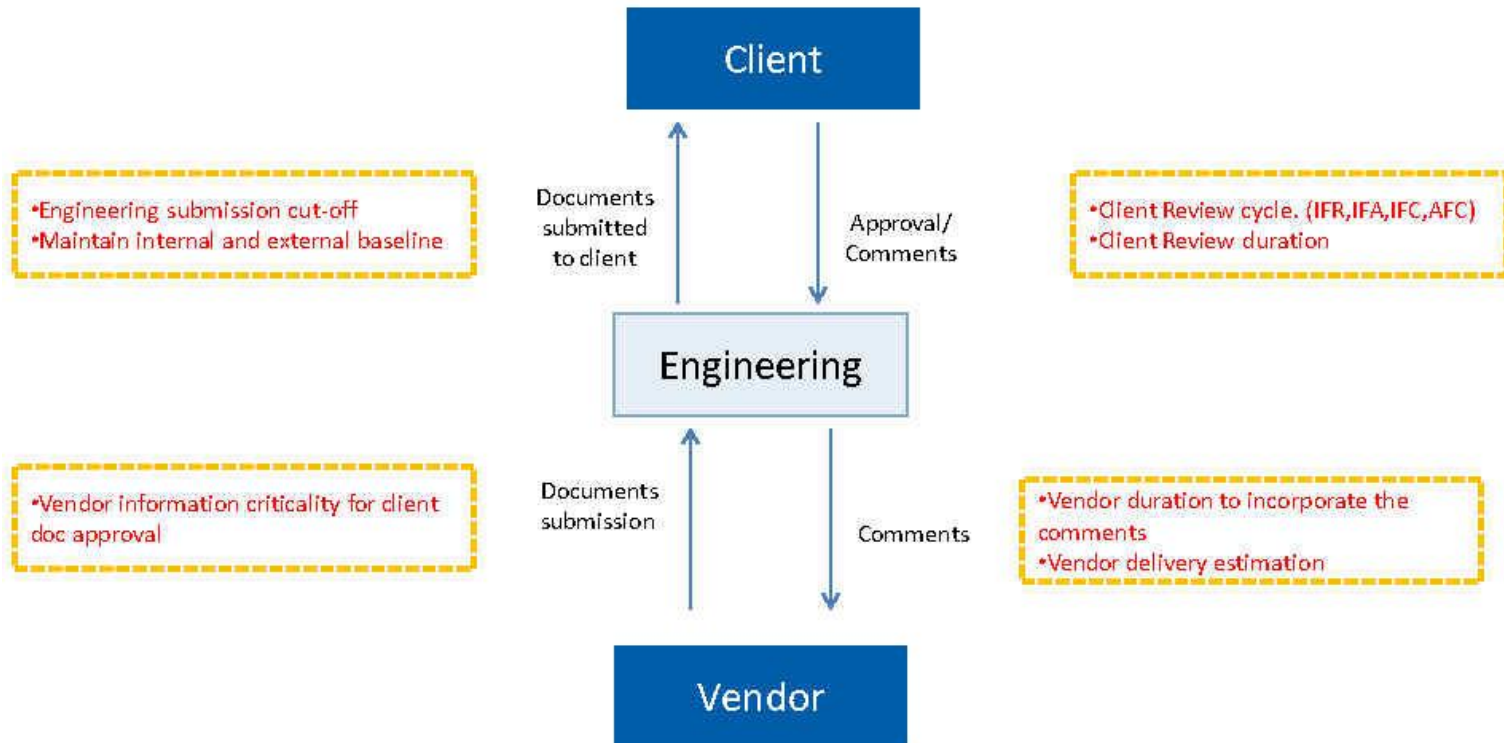
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Engineering Document Review Cycle



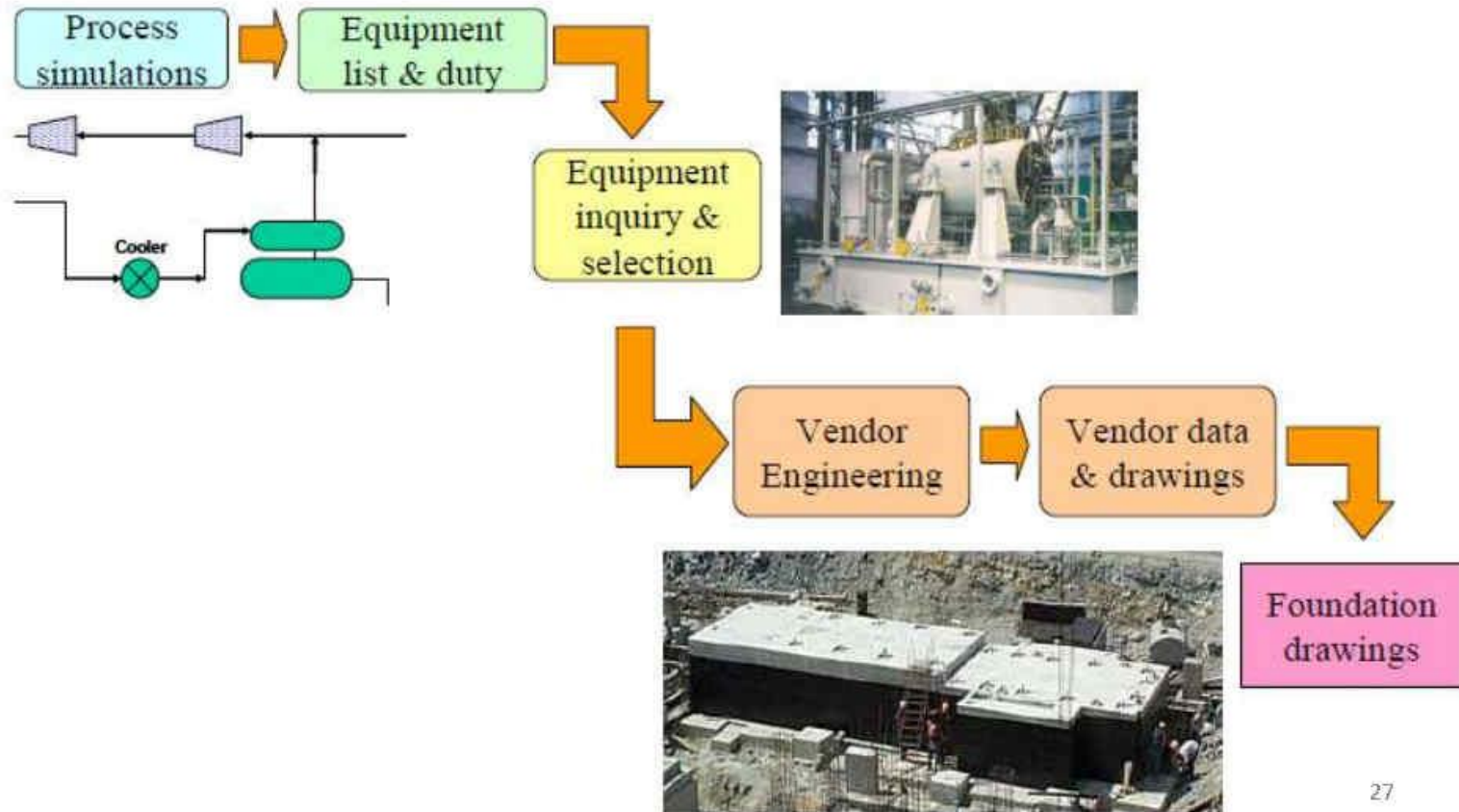
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Document Control



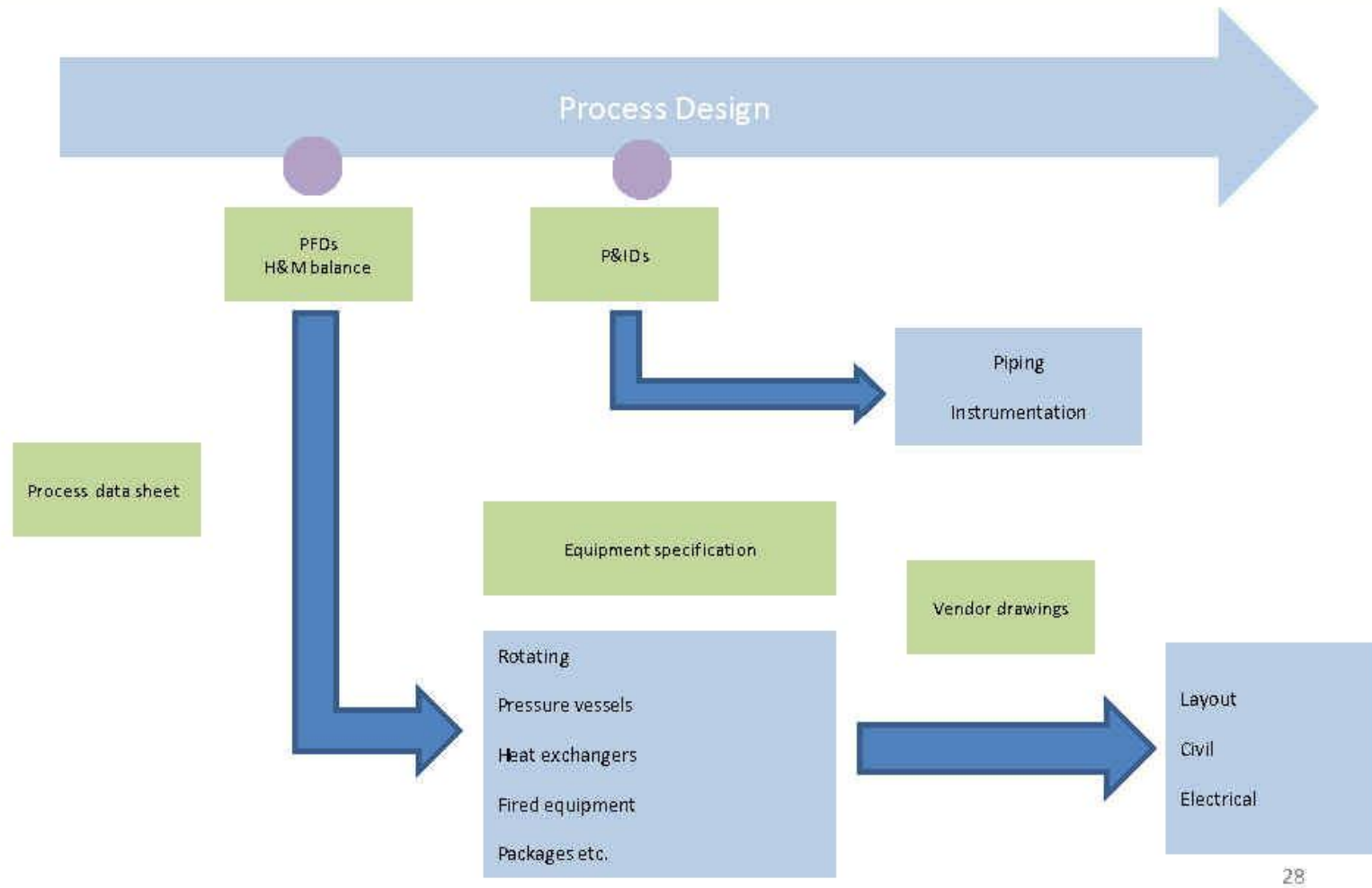
Vendor Data

Engineering is the integrator of the Plant equipment, and is **highly dependent on vendor data**

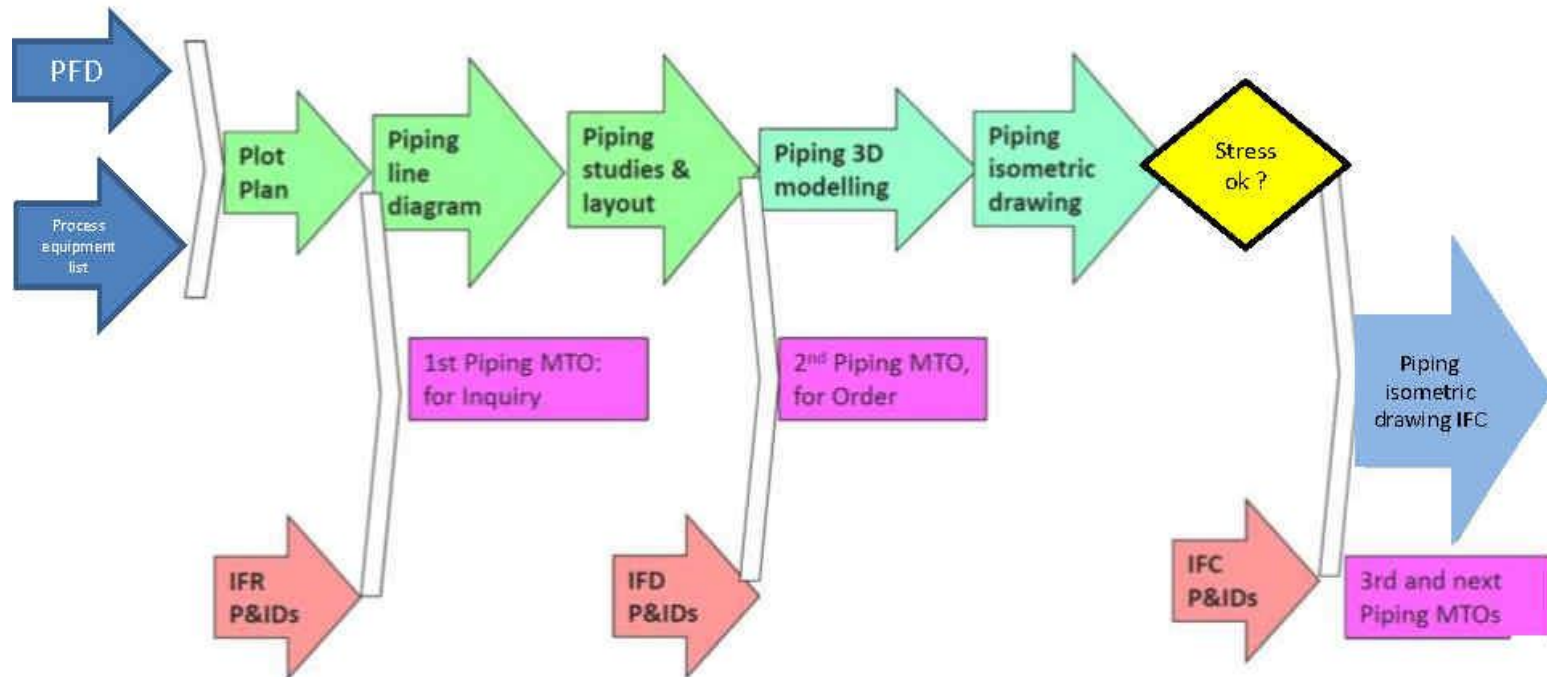


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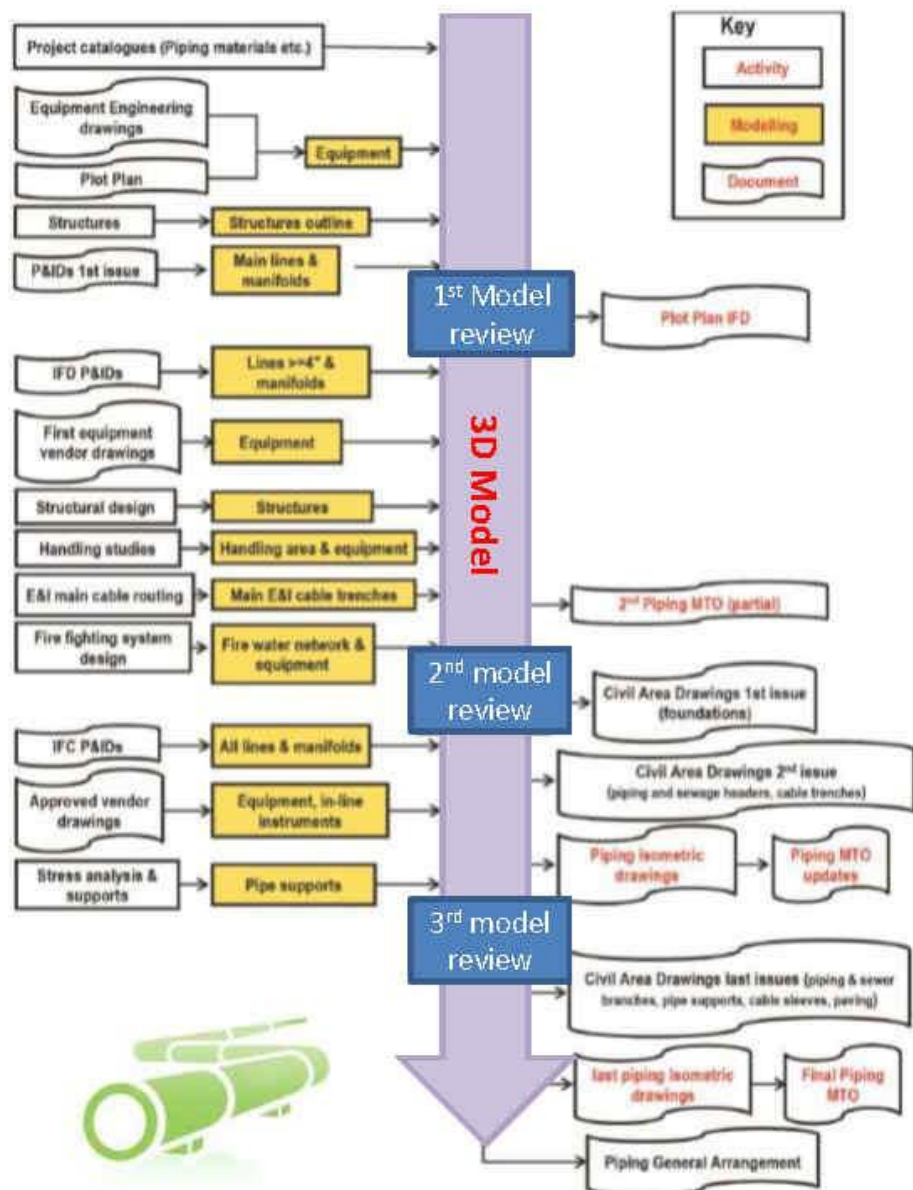
Engineering Work Flow – Process Design



Piping Engineering Flow

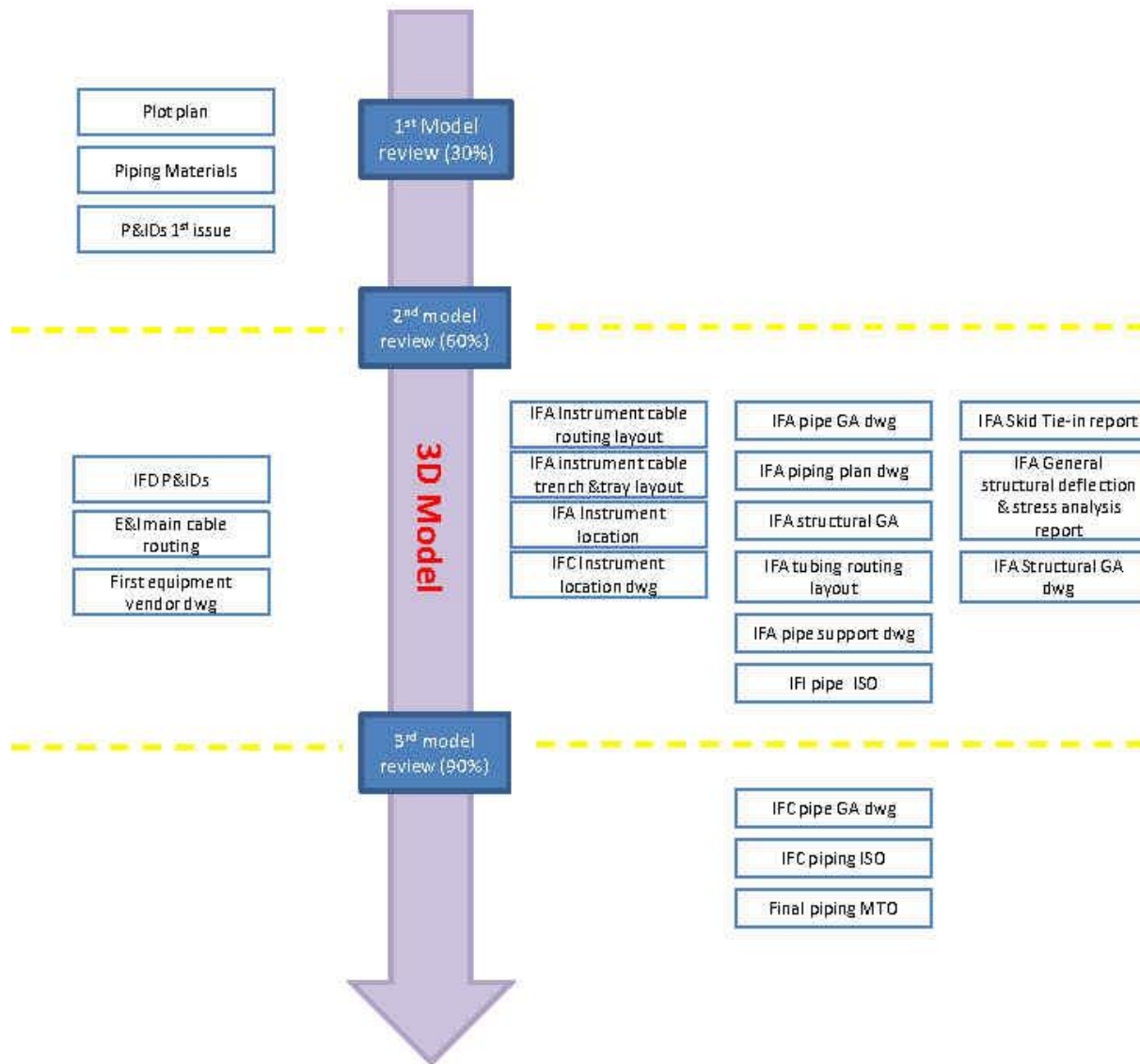


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3D Modeling (General)

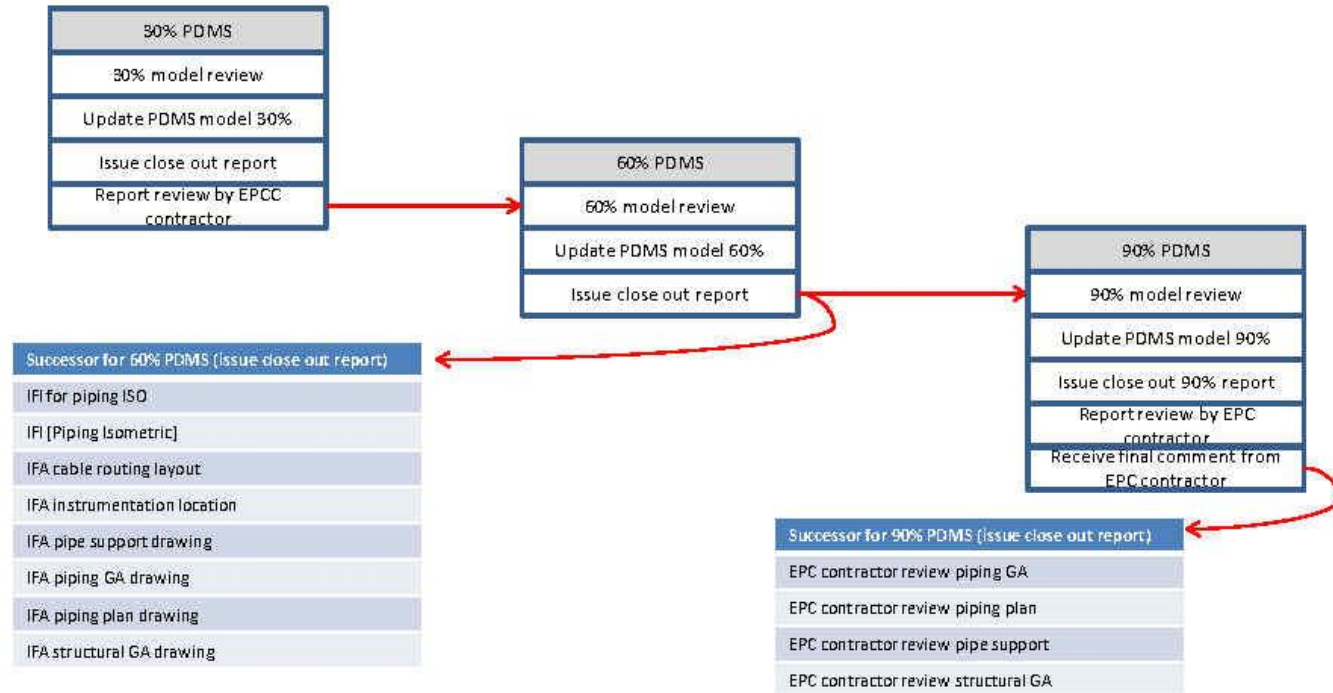
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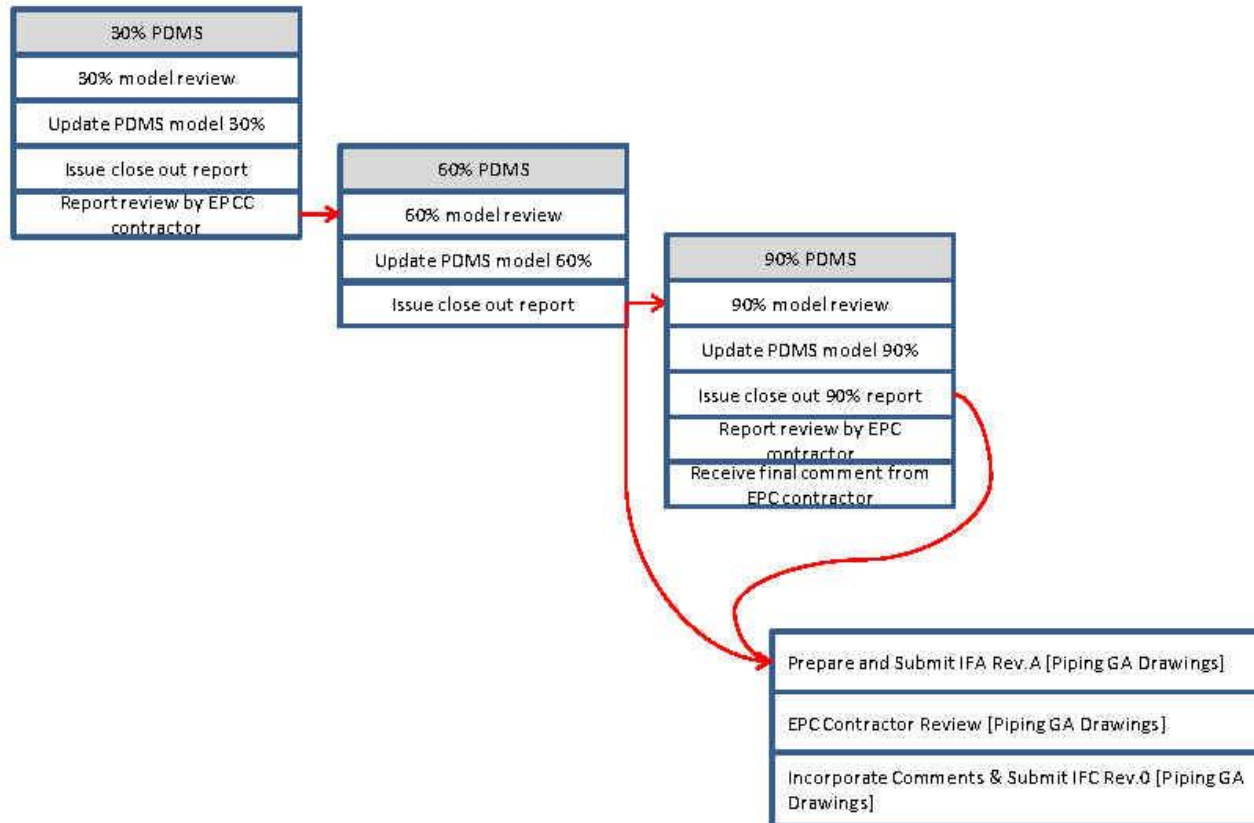
3D Modeling (Skid Project)

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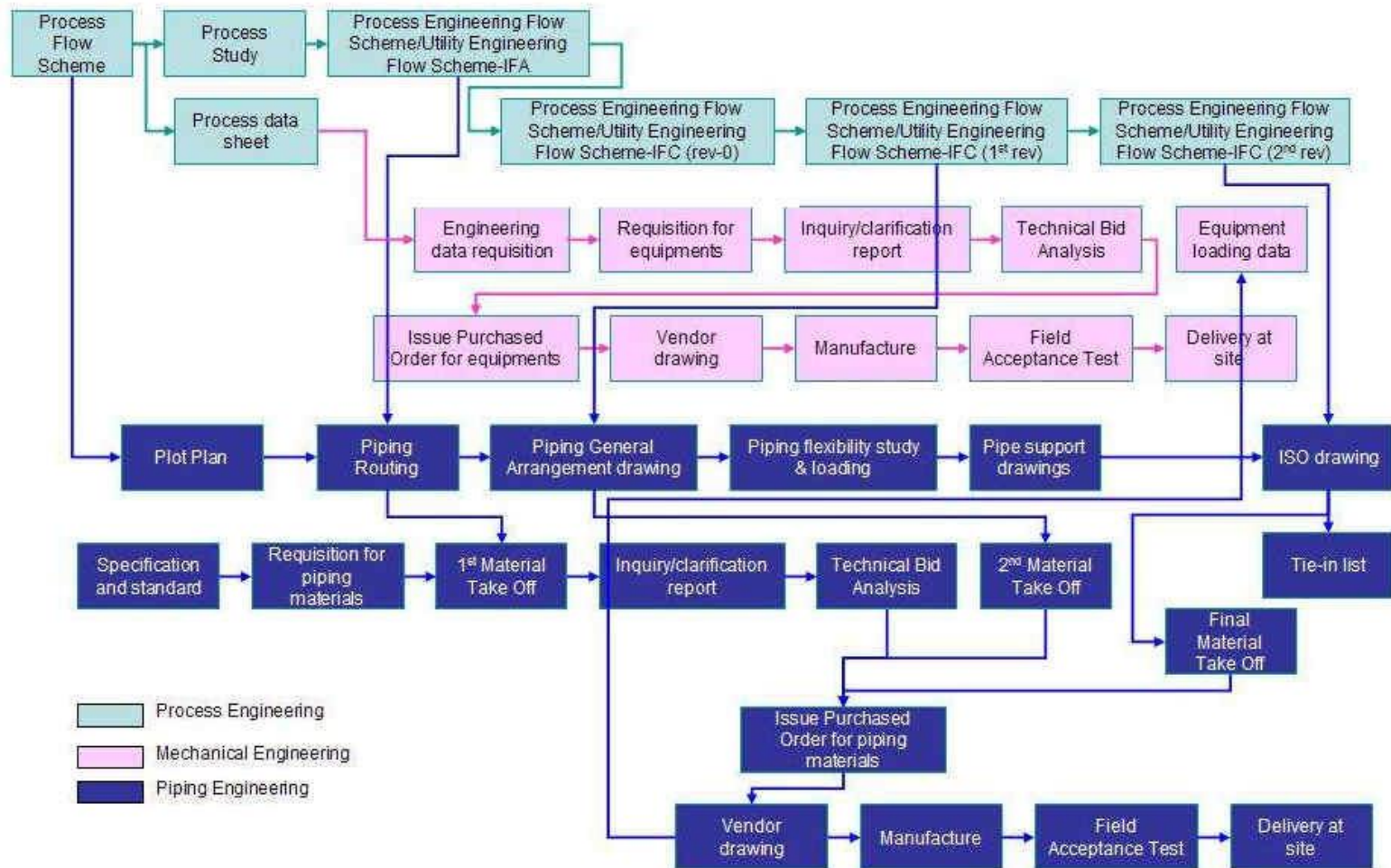
Skid 3D Modelling – Interdependency



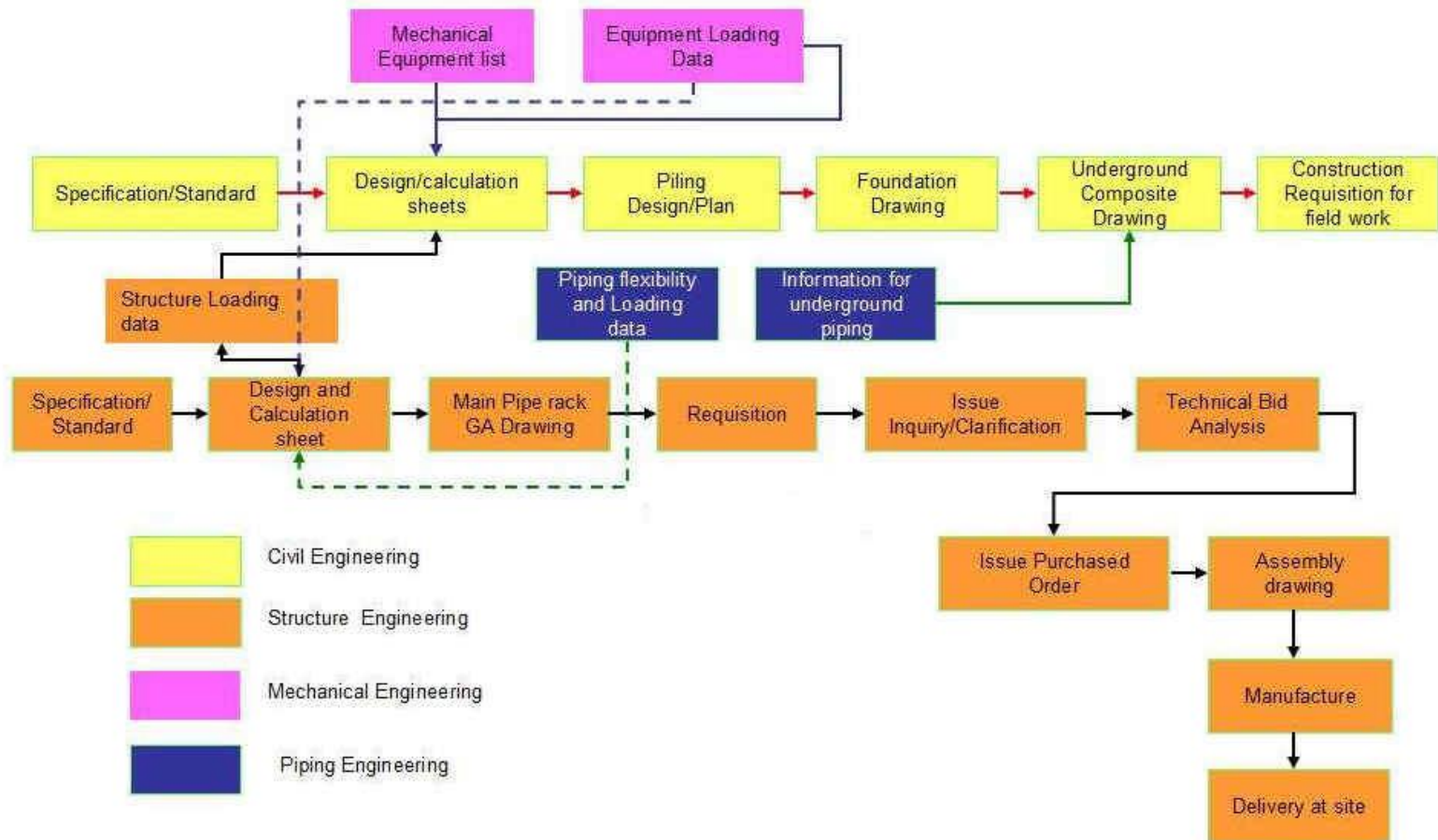
Skid 3D Modelling – Piping GA as example



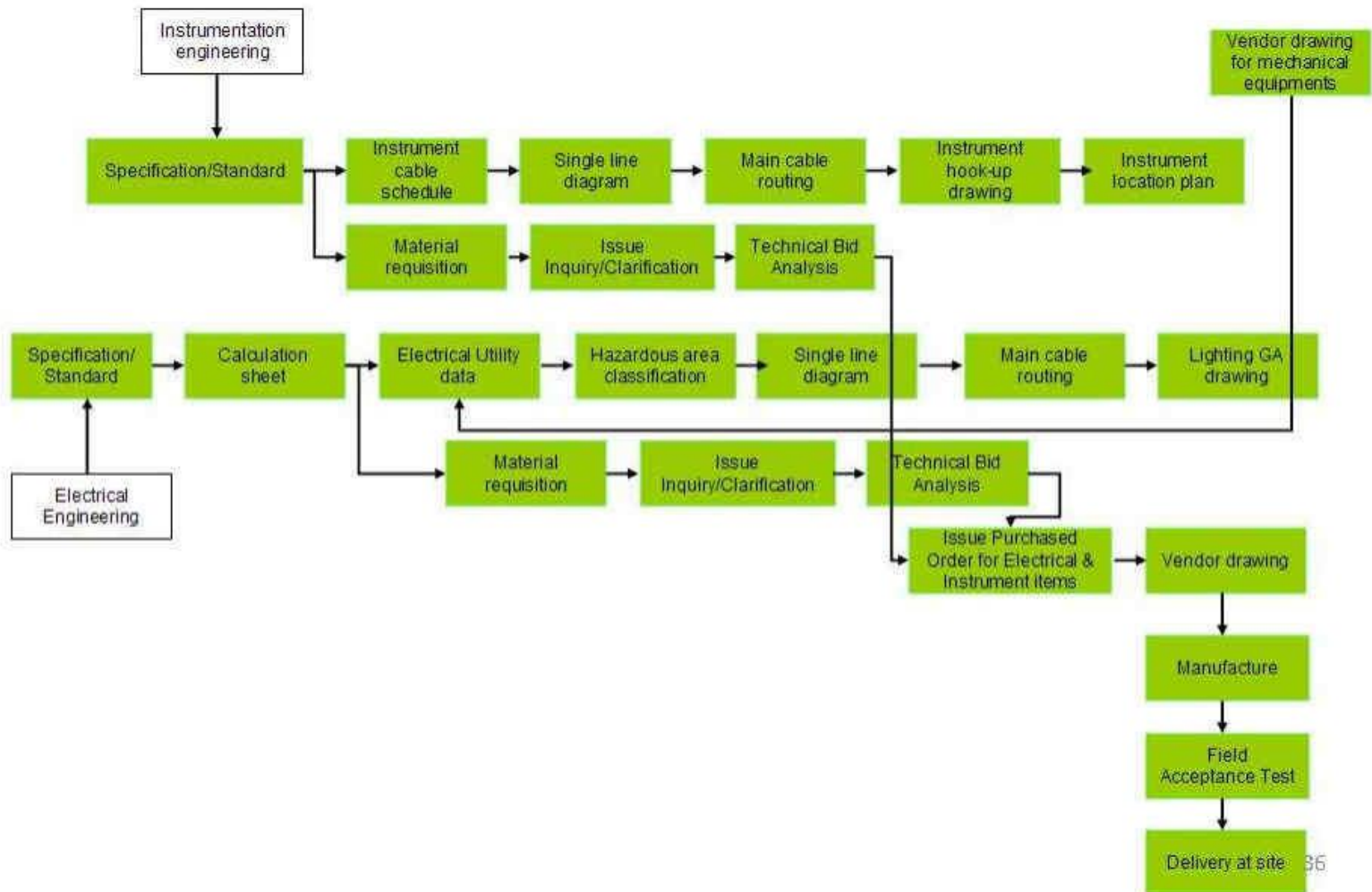
Engineering Work Flow-Process, Mech and Piping



Engineering Work Flow –C&S, Mech and Piping



Engineering Work Flow – E&I



Engineering Work Flow – Instrumentation

- Instrument I/O List
- Instrument Index
- Instrument Data sheet
- Instrument Hookup Diagram
- Instrument Loop Diagram
- Instrument Layout Diagram
- Cause & Effect Diagram
- Cable Schedule Diagram
- Project Interconnection Diagram

Engineering Work Flow – Instrumentation

I/O List is a contains list of instrumentation which serve as an input or output of control system. Hence the tag number that physically has a cable which connects to the control system appears on I/O list.

Instrument index is a document containing list of instrument devices within a plant. Instrument Index shall include tag number of all physical instruments

I/O Count will determines the required capacity of a system

