



# LEAN CONSTRUCTION

## MATERIAL MANAGEMENT & CONSTRUCTABILITY

Rome, July 22<sup>nd</sup> 2013

**MAURIZIO M. GRANATA**

Business Development Executive

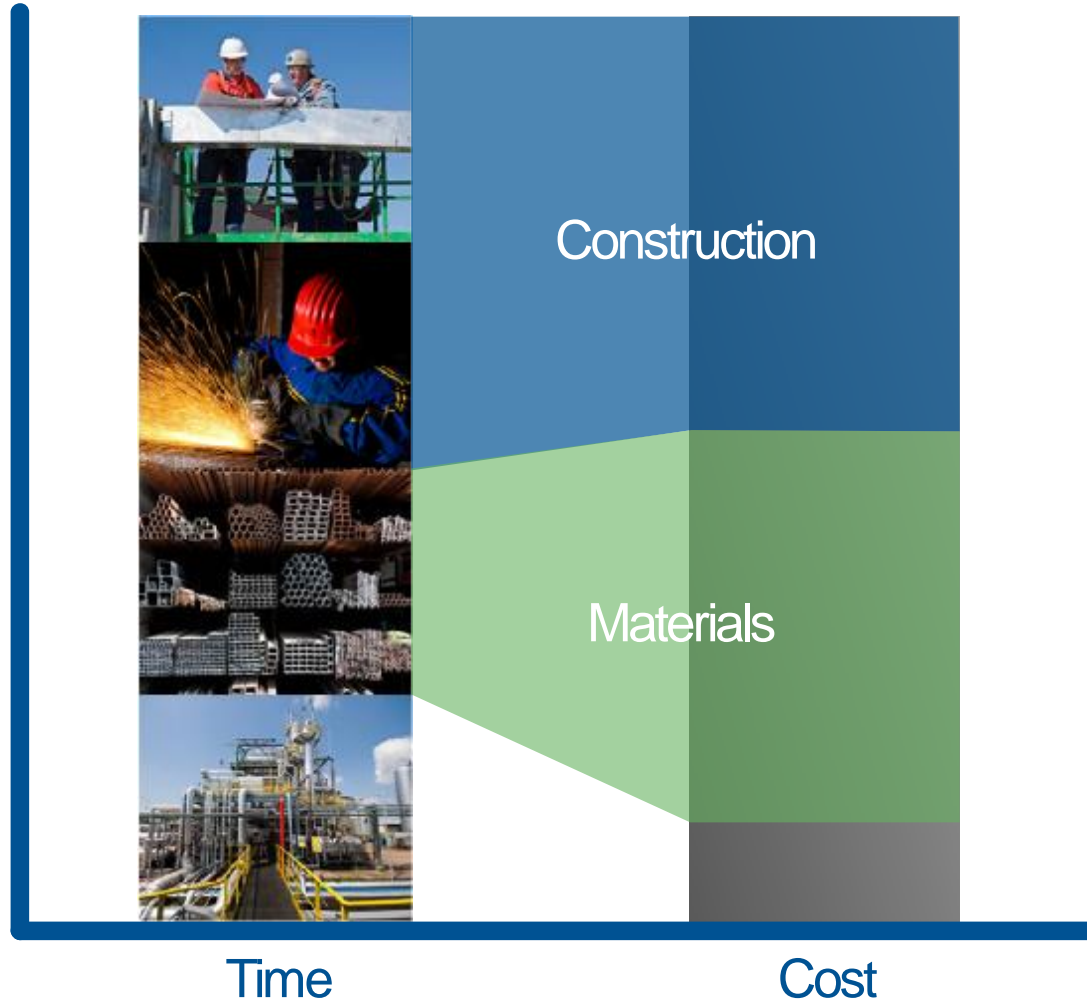
EMIA – Materials, Procurement & Construction Solutions



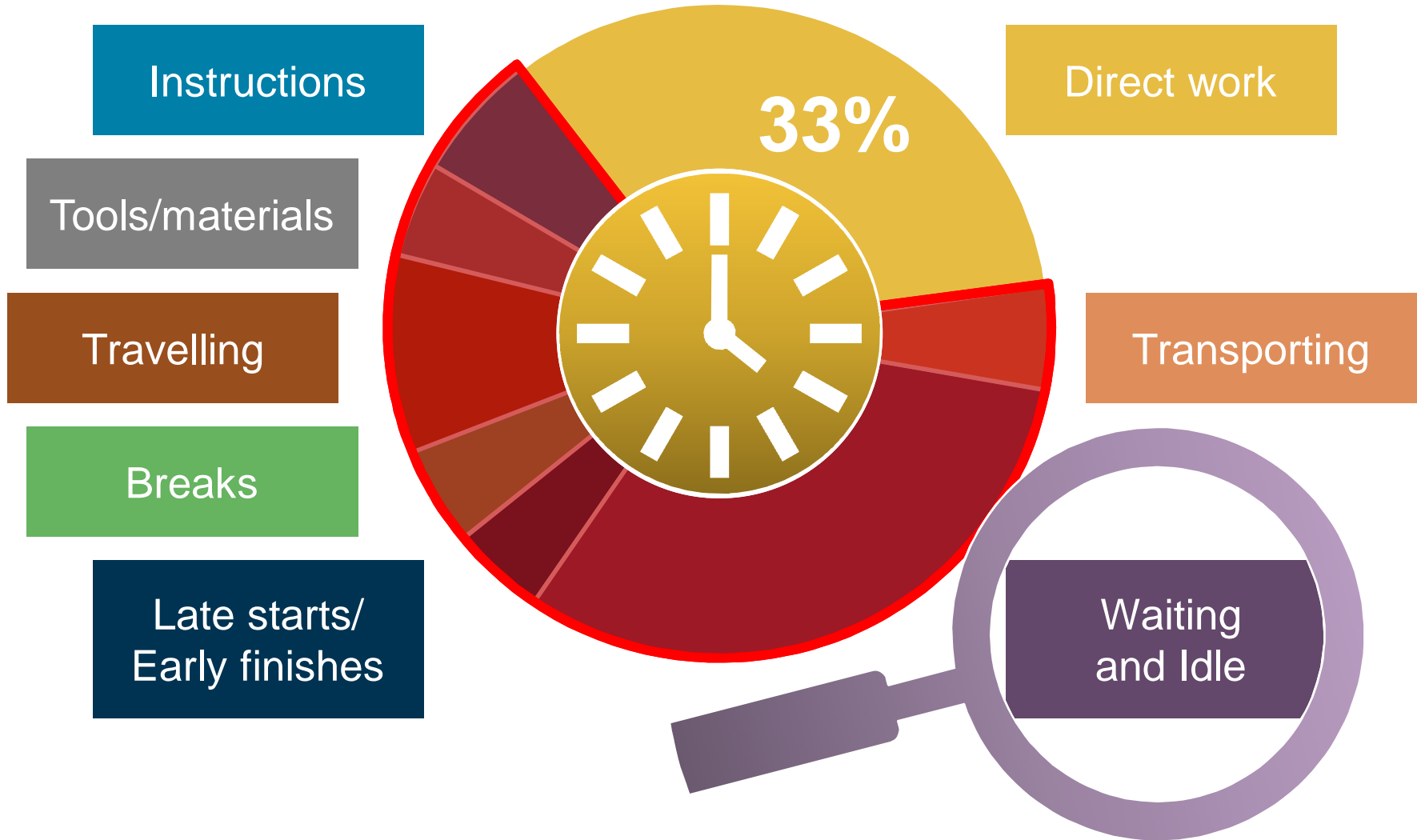
# Construction Sites



100%



# Construction Challenge



# Construction Challenge



What



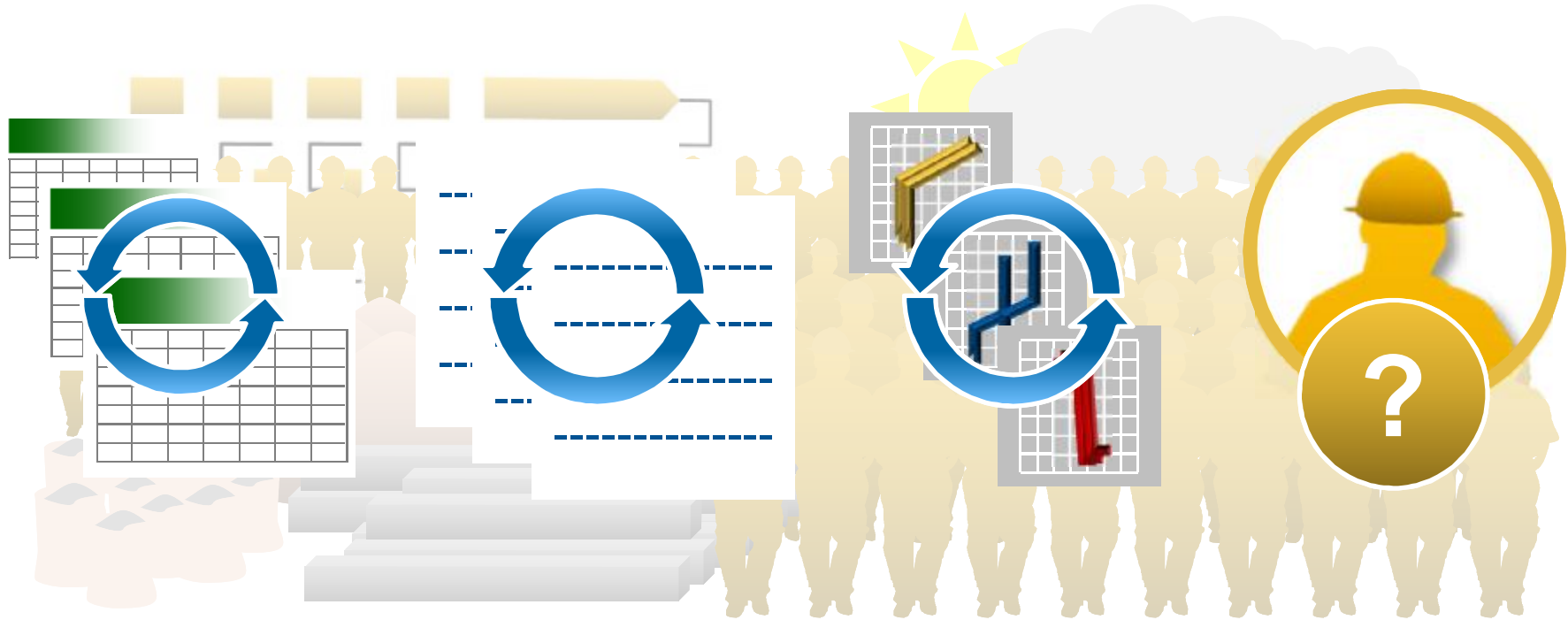
When



Who



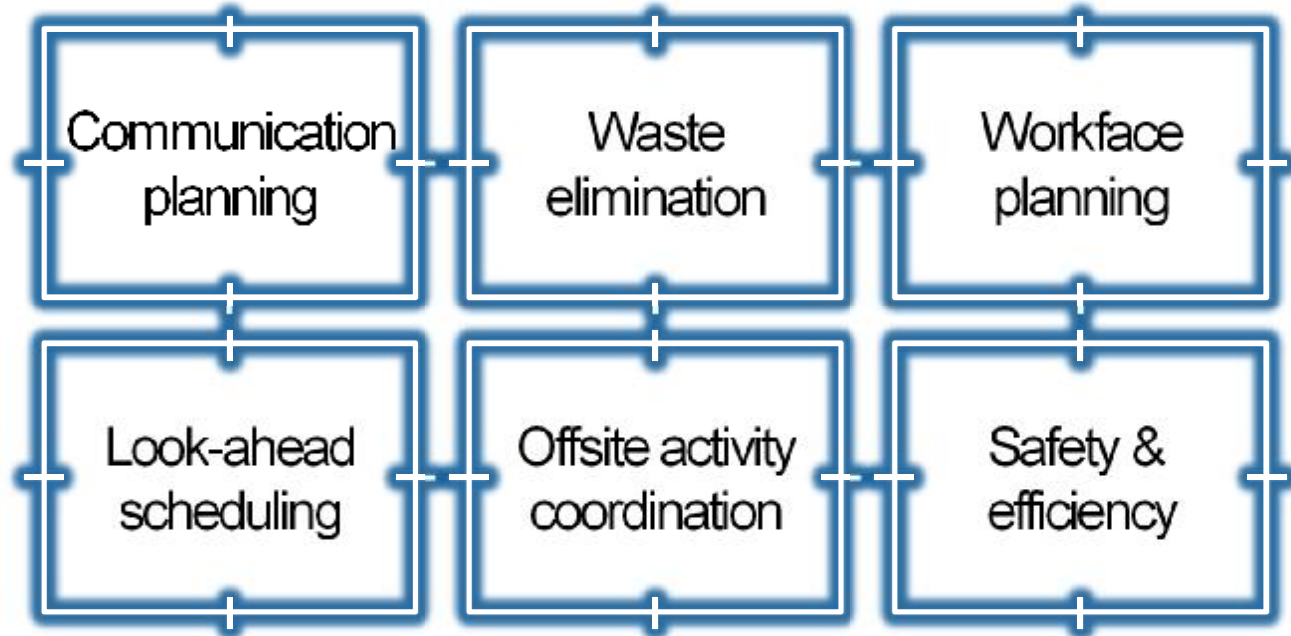
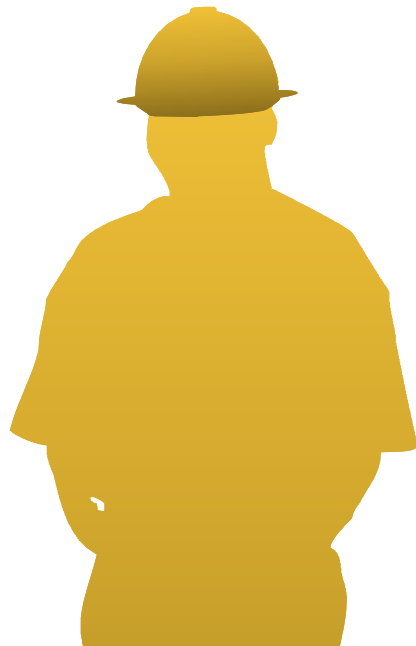
Materials



# Paradigm Shift In Construction



# Lean Construction Principles

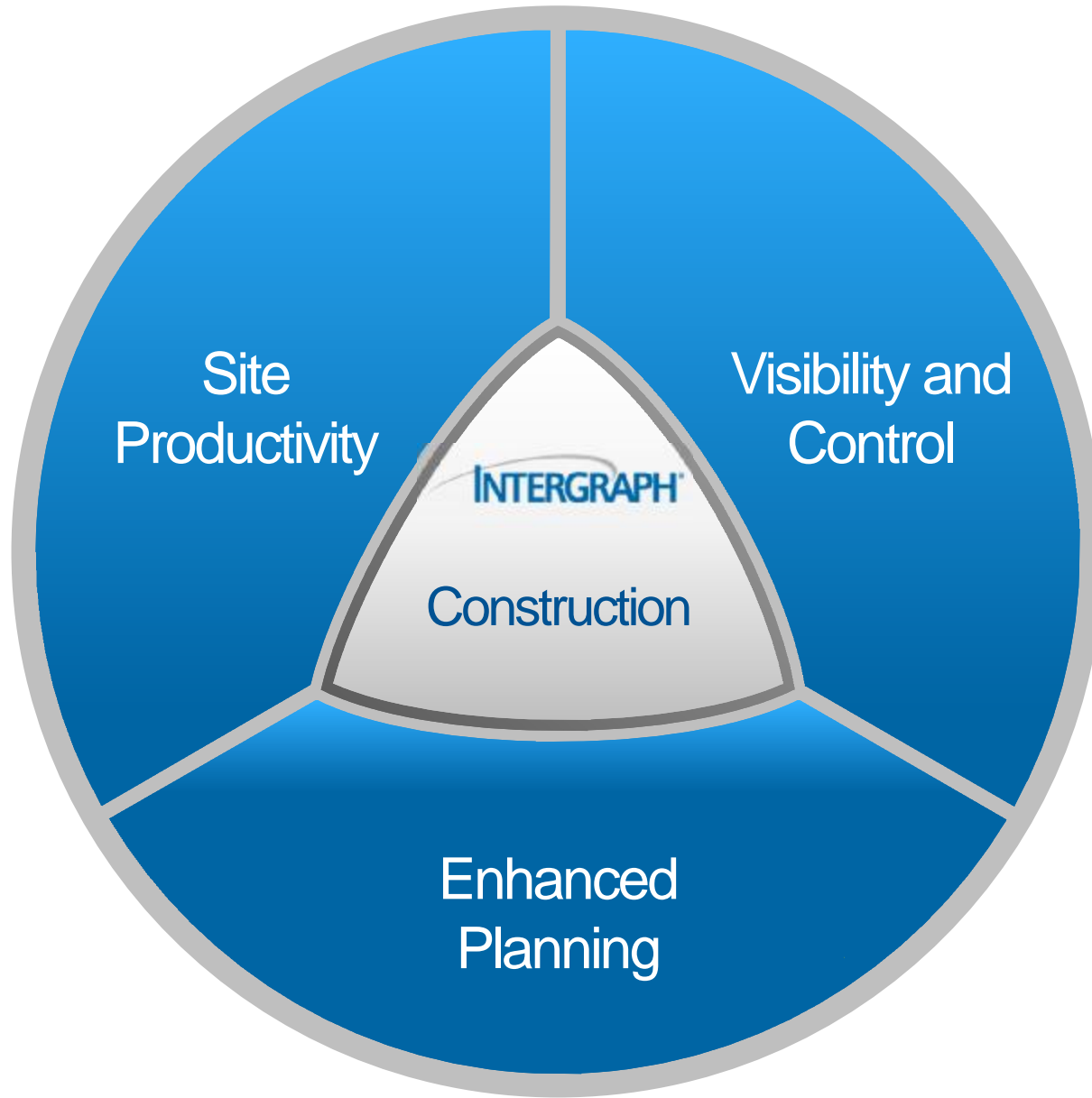


*“A way to design production systems to minimize waste of materials, time, and effort in order to generate the maximum possible amount of value”*

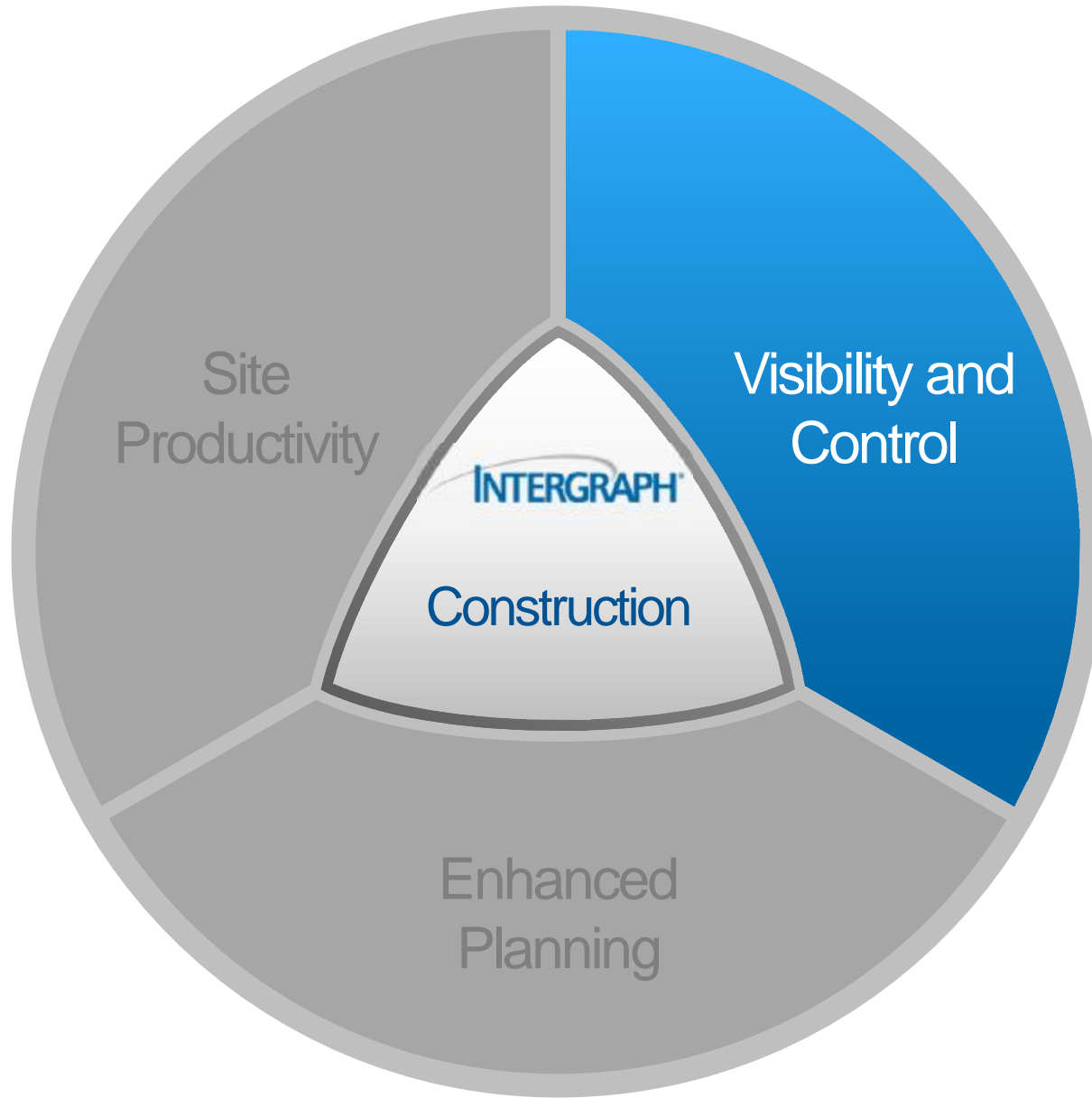
(Koskela et al., 2002)

# Advances in Lean Construction Practices







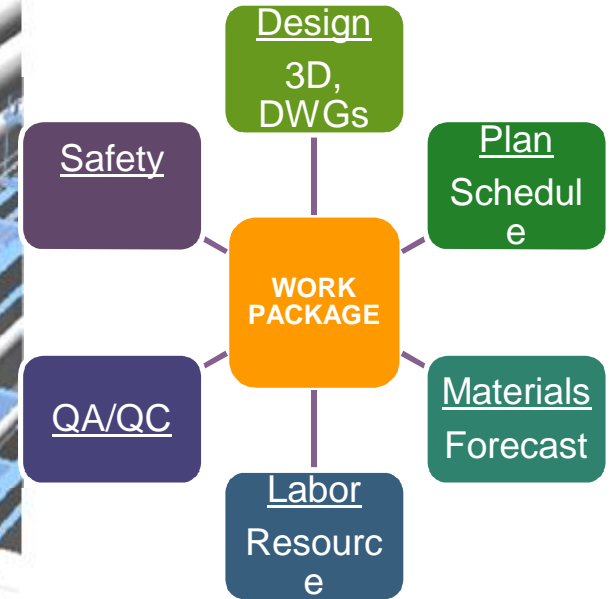


# Visibility in Smart 3D Model





# Planning Construction Works – Earlier



Data

Planning

Execution



# Just-in-time Deliveries



SmartPlant Construction

Super User | SPC441 | Current View: 4D-Concrete\_02

4D-Concrete\_02

Overview

SmartPlant Construction

Super User | SPC441 | Current View: Piping Fabrication

Piping Fabrication

Overview | Details | Schedule | Drawings | Components | Constraints | **Materials** | Material Request | Files | Snap

Forecast | Reservation

Drawing Number	Commodity Code	Description	Size	Size 2	Size 3	Size 4	Tag	Ident Code	ETA	Required on Site	BCM Quantity
03-MS-2002_01.POD	BE9LABMBEACKZZZ	90 Deg. LR Elbow , B16.9 , BE , ASTM A234 G	8	S-STD	0	0		I0406420	09/02/2013 ⚠	09/27/2013 ⚠	1
03-MS-2002_01.POD	PPPABQB EADLBAIZ	Pipe , B36.10M , BE ASTM A53-B , Type S, Sln	8	S-STD	0	0		I9751452	09/02/2013 ⚠	09/27/2013 ⚠	0.984
03-MS-2002_01.POD	FWNABLDRFACGZZZ	WN Flg. , B16.5 , CL 150 , RFFE ASTM A105	6	S-STD	0	0		I4340874	⚠		1
03-MS-2002_01.POD	FWNABLDRFACGZZZ	WN Flg. , B16.5 , CL 150 , RFFE ASTM A105	8	S-STD	0	0		I4340875	⚠		1
03-MS-2002_01.POD	BE9LABMBEACKZZZ	90 Deg. LR Elbow , B16.9 , BE , ASTM A234 G	8	S-STD	0	0		I0406420	09/02/2013 ⚠	09/27/2013 ⚠	1
03-MS-2002_01.POD	FWNABLDRFACGZZZ	WN Flg. , B16.5 , CL 150 , RFFE ASTM A105	8	S-STD	0	0		I4340875	⚠		1
03-MS-2002_01.POD	BE9LABMBEACKZZZ	90 Deg. LR Elbow , B16.9 , BE , ASTM A234 G	8	S-STD	0	0		I0406420	09/02/2013 ⚠	09/27/2013 ⚠	1
03-MS-2002_01.POD	BWELAMB EACGZZZ	Weldolet , MSS SP-97 , BE ASTM A105	8	6	S-STD	S-STD		I5455661	09/02/2013 ⚠	09/27/2013 ⚠	1
03-MS-2002_01.POD	BE9LABMBEACKZZZ	90 Deg. LR Elbow , B16.9 , BE , ASTM A234 G	8	S-STD	0	0		I0406420	09/02/2013 ⚠	09/27/2013 ⚠	1
03-MS-2002_01.POD	PPPABQB EADLBAIZ	Pipe , B36.10M , BE ASTM A53-B , Type S, Sln	8	S-STD	0	0		I9751452	09/02/2013 ⚠	09/27/2013 ⚠	18.701
03-MS-2002_01.POD	PPPABQB EADLBAIZ	Pipe , B36.10M , BE ASTM A53-B , Type S, Sln	8	S-STD	0	0		I9751452	09/02/2013 ⚠	09/27/2013 ⚠	0.984
03-MS-2002_01.POD	PPPABQB EADLBAIZ	Pipe , B36.10M , BE ASTM A53-B , Type S, Sln	8	S-STD	0	0		I9751452	09/02/2013 ⚠	09/27/2013 ⚠	0.984
03-MS-2002_01.POD	FWNABLDRFACGZZZ	WN Flg. , B16.5 , CL 150 , RFFE ASTM A105	8	S-STD	0	0		I4340875	⚠		1

Last Forecast: 5/7/2013 12:04 PM

Run Forecast | Reserve | Close

# Construction Projects

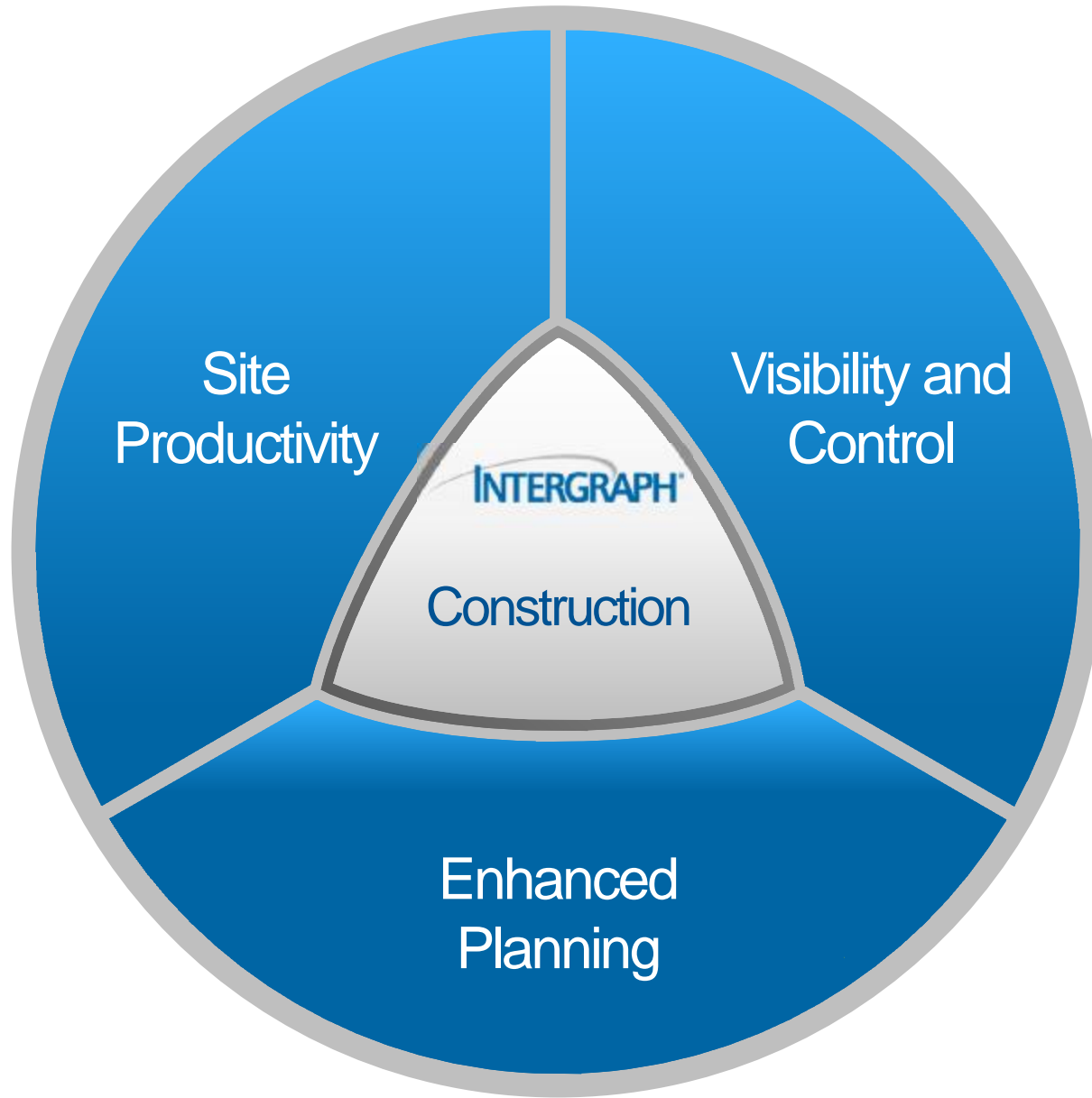


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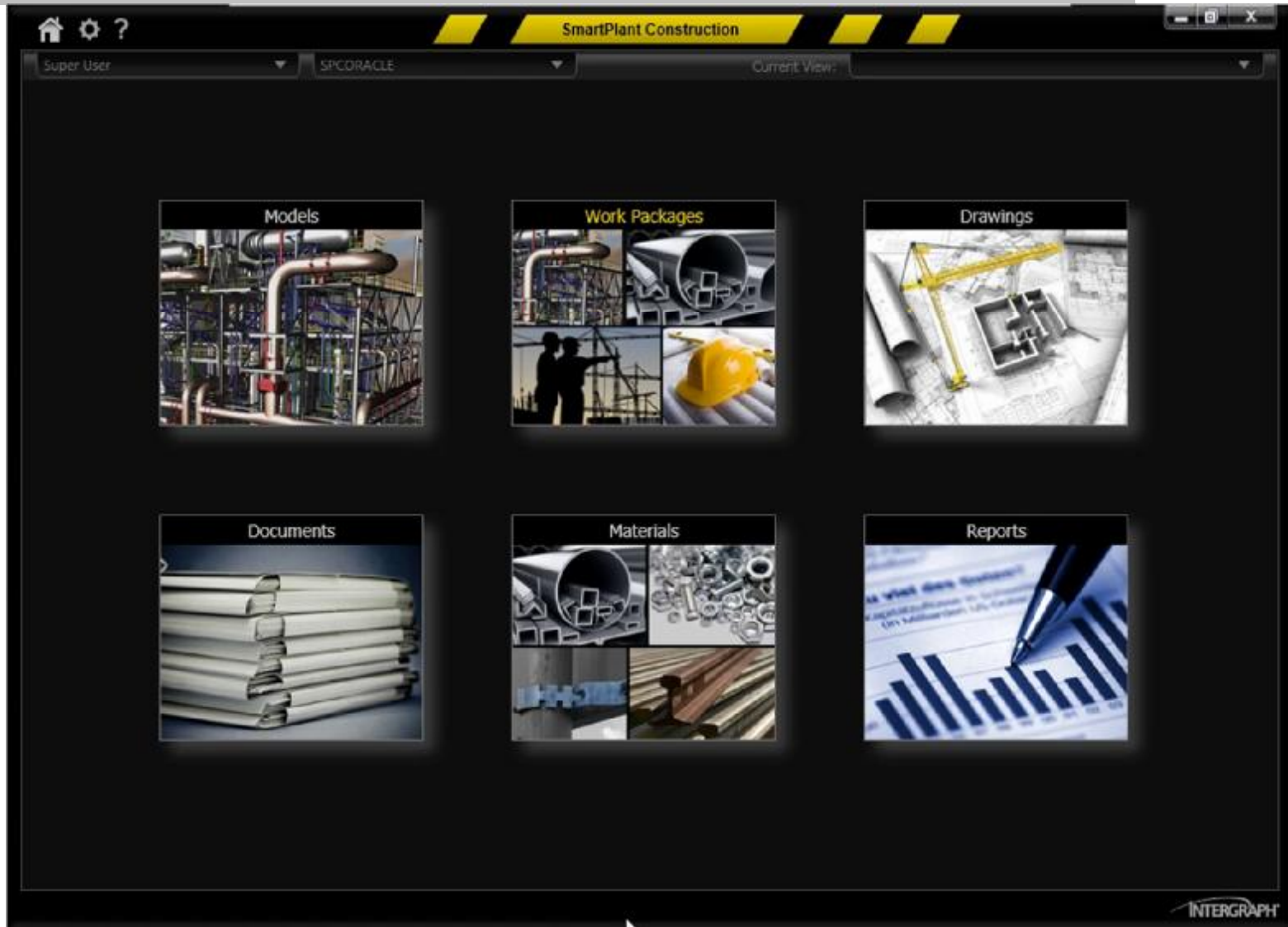
Time

What	When
Who	Where





# SmartPlant Construction in action



**FLUOR**



**INTERGRAPH**

February 2013 SPC goes into production on  
Shell Quest Project in Calgary, Alberta





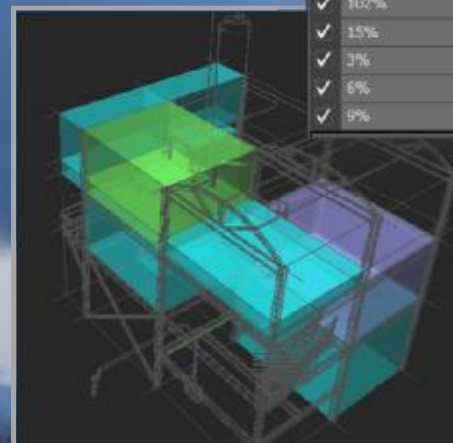
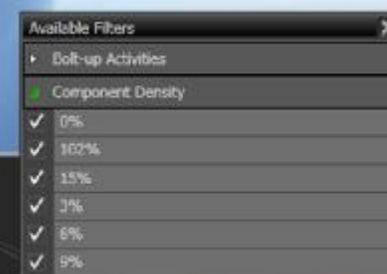
Kencana goes into production May 1<sup>st</sup> fabricating modules for Wheatstone LNG Project in Australia



Reliance to install SPC 2013 in May OOTB. Production has started earlier this month. Project has over 1 million spools



- § 1<sup>st</sup> in the world in nuclear power plant construction
- § 2<sup>nd</sup> in the world for nuclear power generation



Keppel **FELS**



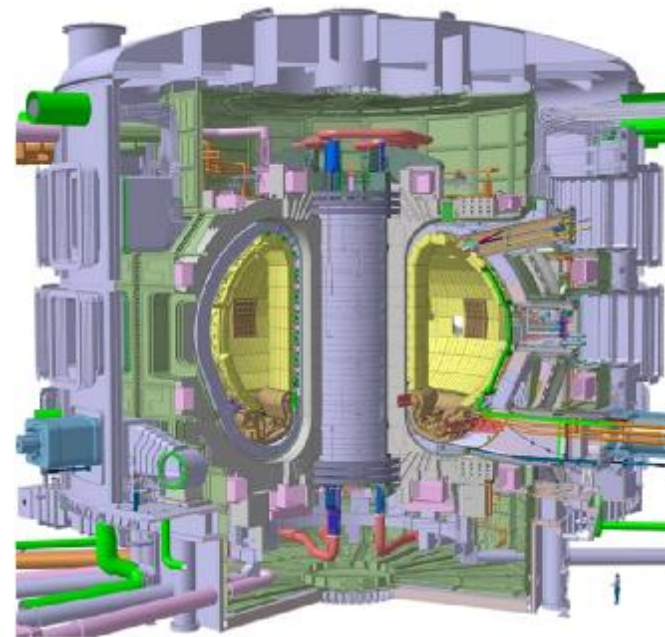
Keppel will put SPC in production on pipe & panel line fabrication starting October 2013





*ITER, currently building the world's largest and most advanced experimental nuclear fusion reactor at Cadarache in France has selected Intergraph's products including....*

SPC to handle the assembly, commissioning and construction of the reactor.





Italy's largest supplier, installer and service provider for power generation plants and components

**2011 Activity:**

- Intergraph PoC project service proposal selected

**2012 Activity:**

- Jan-July Evaluation
- November Internal evaluation & green light from the top management
- December CEO approval & internal kick-off

**2013 Activity:**

- April SPC Release 2013 will be installed
- Dec SPC will go into production of Project

Proposed solutions (by introduction sequence)

1. SPP&ID, S3D, SPF, **SmartPlant Construction**
2. SPMat, SPRD,
3. Spoolgen, Caesar II - TBC







# Integrating the Engineering Enterprise



**INTERGRAPH®**