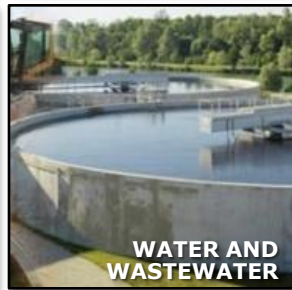
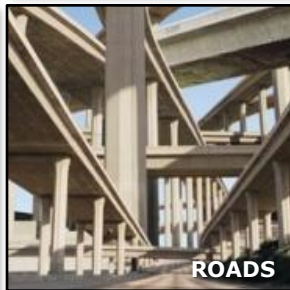




ConstructSim

Solutions



Introducing ConstructSim

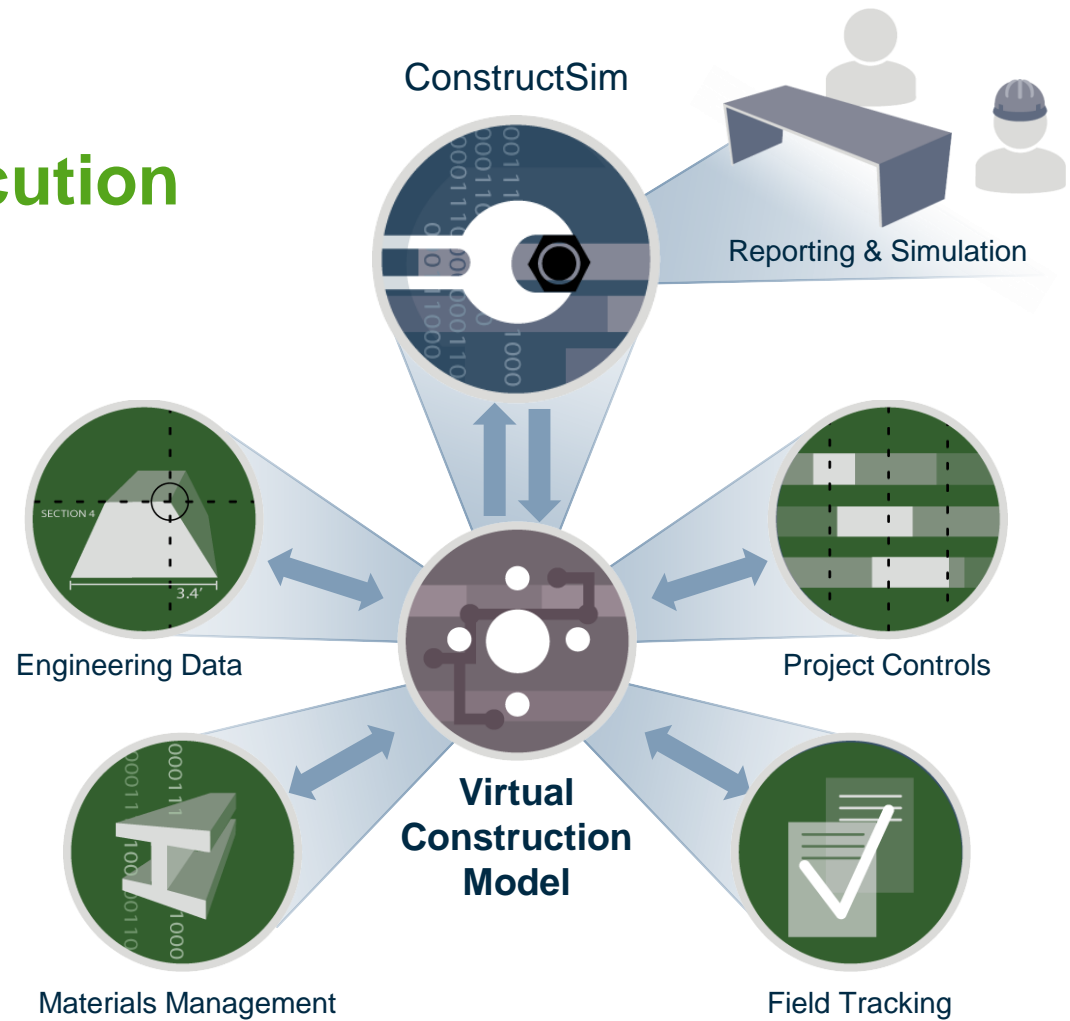
**Solves complex
planning and execution
problems for**

For Who?

- Owners
- Construction Managers
- Direct Hire

When?

- Early Planning
- Field Installation
- Turnover / Commissioning



Addresses These Main Issues



Visibility into the planned and current project status



Material availability / engineering drawing production



Cost to complete



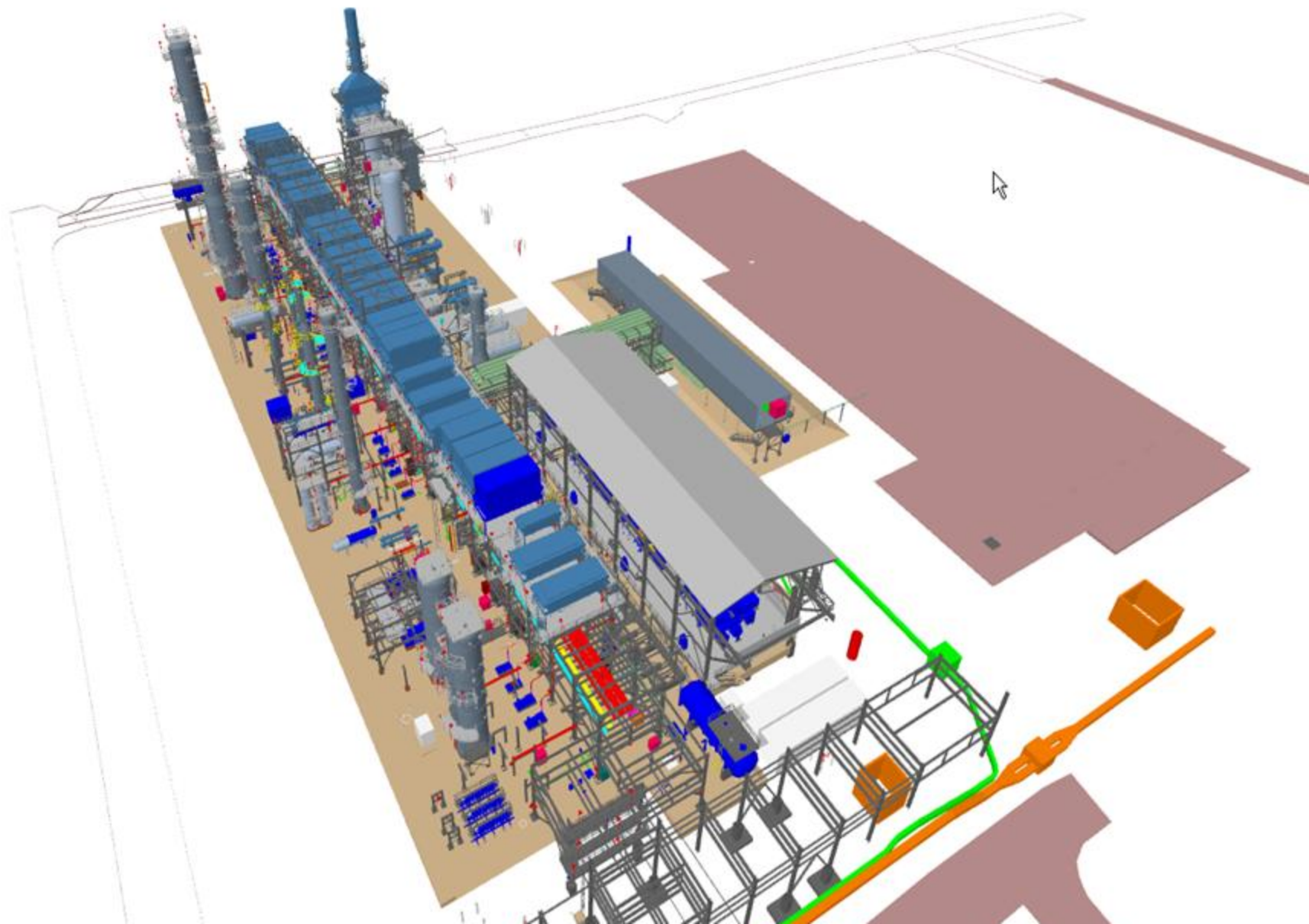
Information management / Aggregation



Reactive construction management



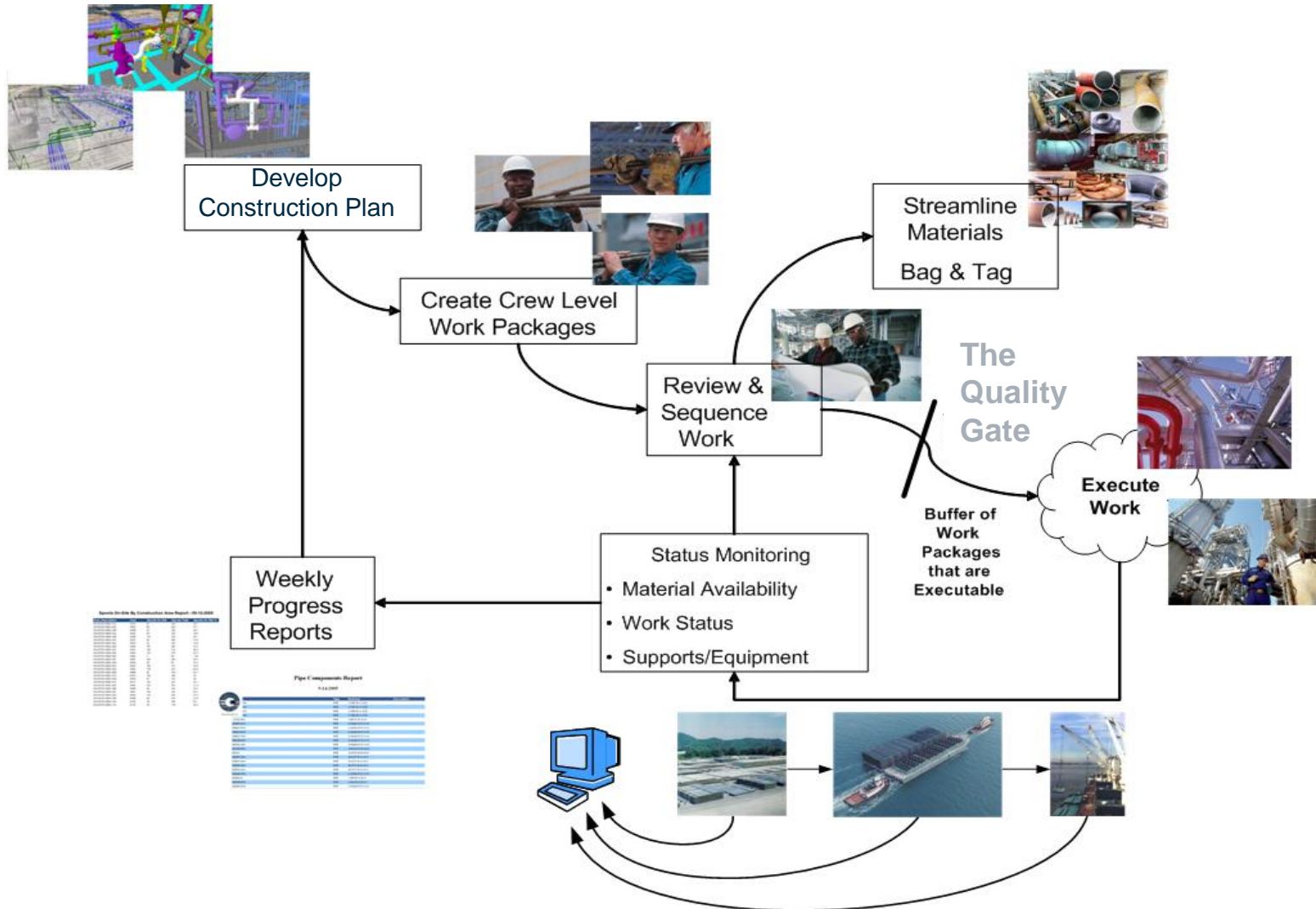
Productivity of field labor



Main Functionality

- Virtual Construction Model – dynamic updated daily with data from engineering and construction
- Auto re-organize engr 3D data for construction tracking
 - **Spools (SpoolGen / IsoGen); Steel Piecemarks, etc ...**
- Provide construction views – area & systems (others)
- Work steps that relates to all small pieces (every pipe spool, steel beam) – automatic
- Video game environment to build work packs (detailed planning
 - **Click, click, click -> print reports (spool list, field materials, checklist – aka scorecard – for progressing ... i.e. get paid)**
- Status visualization See progress in 3D
 - **engineering production / Material availability / installation / testing**
- Integration with schedule
 - **Visually produce schedule early in project**
 - **During project ... update schedule weekly with progress (summary reports % complete per schedule)**

Agile Construction Methodology



Agile Construction Methodology

Turnover & Commissioning



Testing & Inspection



Field Installation



Procurement



Offsite
Fabrication



Detailed
Engineering

Identify Key Requirement Dates,
Starting From Project Completion
and Define Schedule through
Backward Chaining of Activities

- Provide prioritization requests / lists
- Monitor available work Fronts
- Auto-trigger “Flags” and expedite items that may delay schedule

Case Study – Off Shore Platform

Project Background

- Deepwater Offshore Platform - \$150M
- Time and materials contract with Fab Yard
- ConstructSim Pipe purchased by Owner and utilized by module Fab Yard contractor



Project Use-Case

- ConstructSim used to re-baseline schedule, prioritize by TO Systems
 - **Finish project on-time, under budget**
- At “sail away”, only 7 Punch List items (compared to 1000’s)
- Development of crew-level work face plans with ConstructSim

Project Return-On-Investment

Investment

Software and Services \$1M

Savings

Reduced project cost from labour efficiency \$17M

Project completes ahead of schedule 3 mo.

Case Study – Diesel Refinery Unit

Project Background

- New Refinery Unit - TIC \$320M.
- Lump Sum Contract with Mechanical Sub
- ConstructSim Pipe purchased by Owner and utilized by Construction Management firm



Project Use-Case

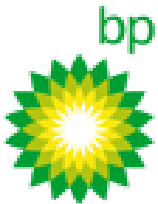
- Actual progress not in alignment with progress reported in field ... Switch to progressing through ConstructSim
 - **Project recovers schedule losses to complete on time**
- Excessive change order submitted by Mechanical Sub
 - ConstructSim used to analyze change order and provide visibility to impact on work

Project Benefits / Savings

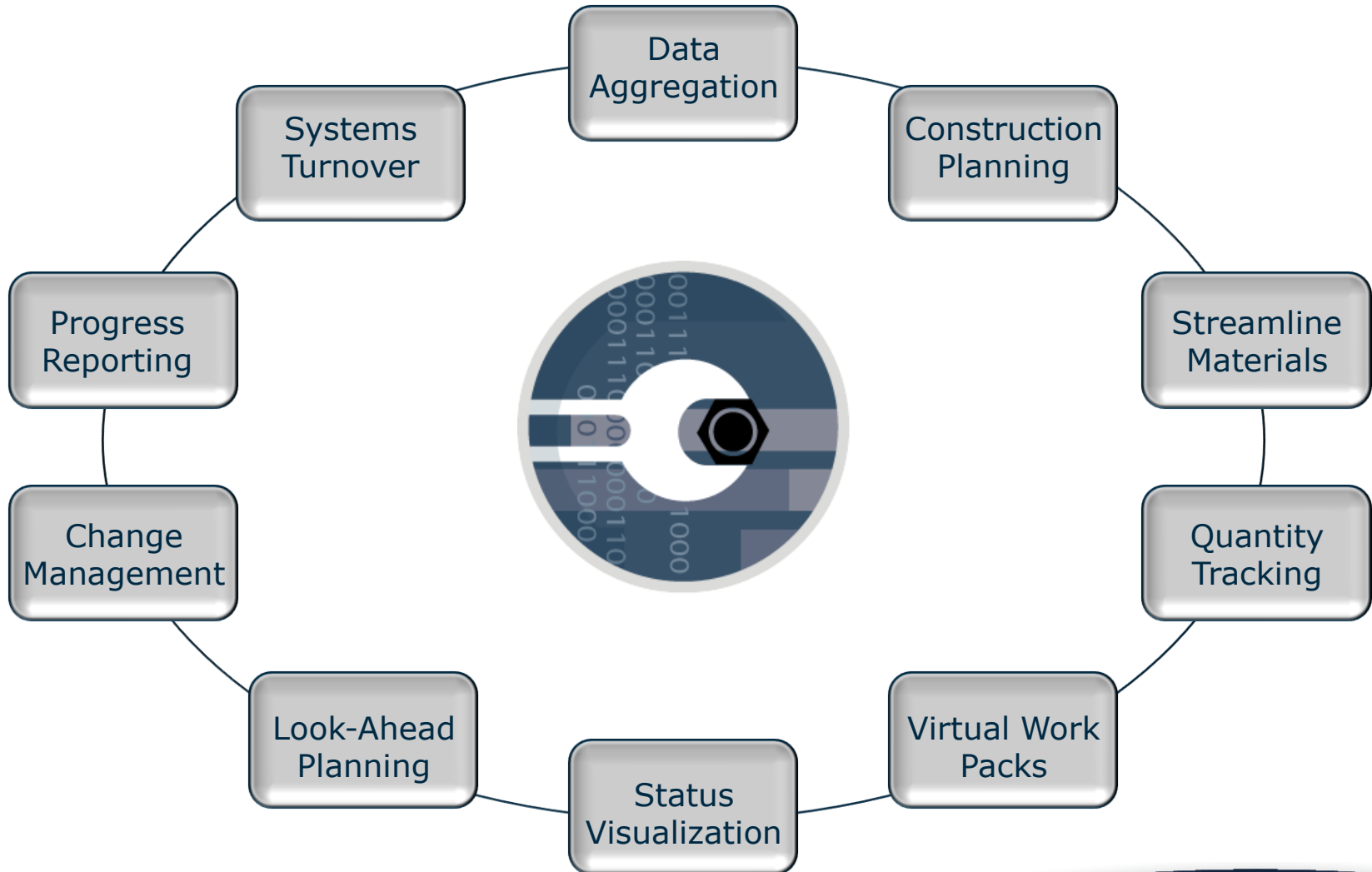
Change order reduced from 2.5M to 500K \$2M

Project recovered and completed on-time

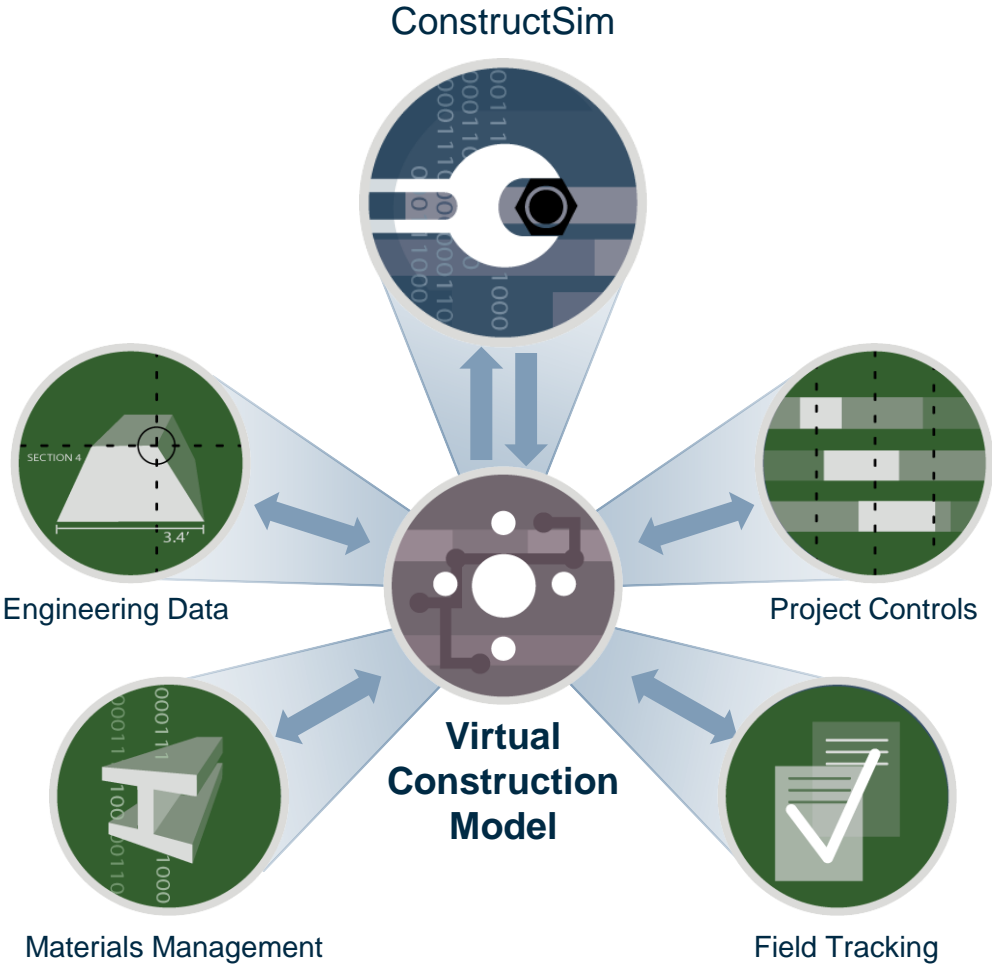
ConstructSim Users



ConstructSim Functionality

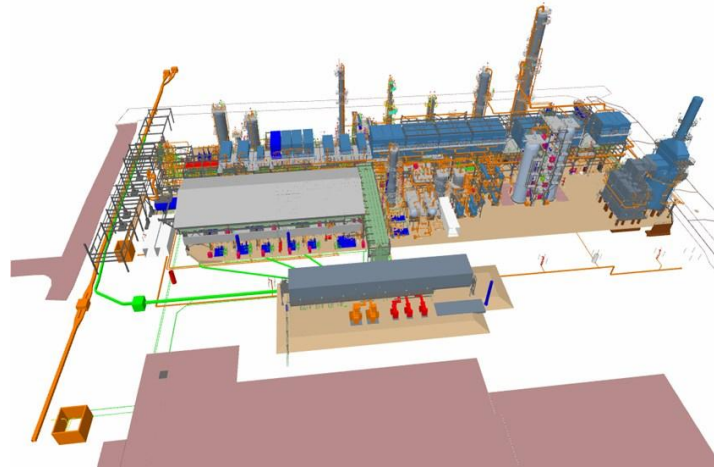
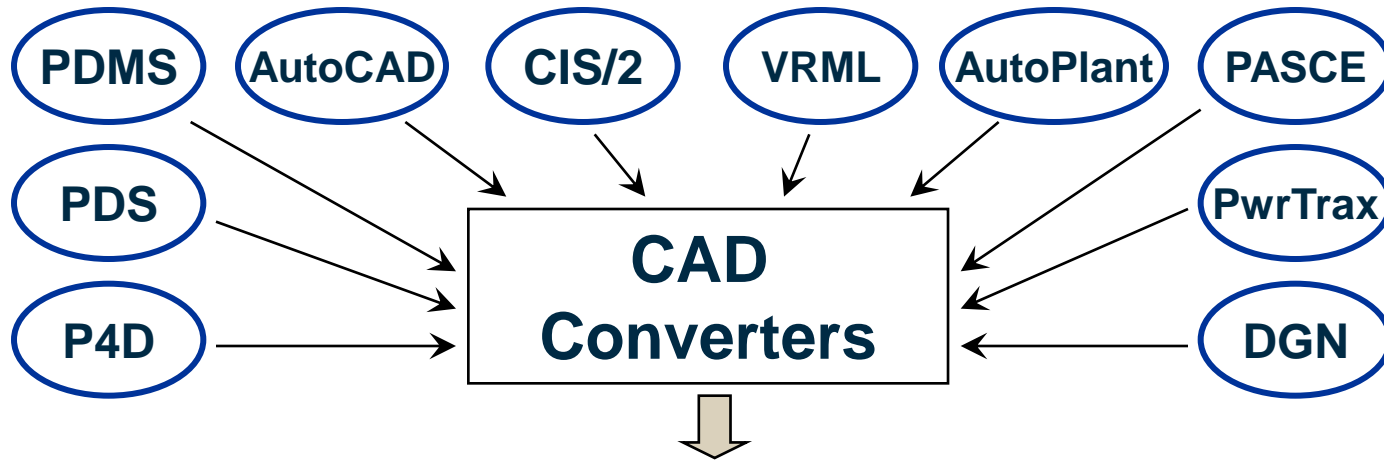


Data Aggregation



 Back

Data Aggregation – CAD Adaptors



Data Aggregation – Digital ISO Input

ConstructSim reads digital ISO files and correlates them with the 3D CAD model

PT NO	DESCRIPTION	DIA (NPD)
1	PIPE, S SMLS, S STD, ASTM A335-P22	8
2	PIPE, S SMLS, S STD, ASTM A335-P22	8
3	PIPE, S SMLS, S STD, ASTM A335-P22	8
4	90 DEG ELBOW, BE, S STD, ASTM A234-WP22	8
5	FLANGE, WN, ANSI-B16.5 CL300, RFFE, S STD BORE, ASTM A182-F22 CL3, STD FIN	8
6	FLANGE, WN, ANSI-B16.5 CL1500, RFFE, S STD BORE, ASTM A182-F22 CL3, 125-250 RA FIN	6

PIPE SUPPORTS

PT NO	DESCRIPTION	DIA (NPD)
7	PIPE SUPPORT TYPE 12	8
8	PIPE SUPPORT TYPE 39	8

FIELD MATERIALS

PT NO	DESCRIPTION	DIA (NPD)
9	FIG. 8 FLG, CL300 RF, ASTM A387 GR 22 CL, 2, B16.48, STD FIN	8
10	DISKET, RF, CL300, SPIRAL WOUND 304SS W/FLEXIBLE GRAPHITE FILLER, 1/8" THK, 2 1/4" CR, FLEXI TALLIC CG	8
11	DISKET, CL1500, RF, SPW 304SS W/FLEXIBLE GRAPHITE FLR, 1/8" THK 2-1/4" CR & TR, FLEX CGI	6
12	STUD BOLT, FULL THRD, ASTM A193-B7 W/A194-2H HWY HEX NTS, 1.8, 25" BOLT LENGTH	1.3/8
13	STUD BOLT, FULL THRD, ASTM A193-B7 W/A194-2H HWY HEX NTS, 6, 75" BOLT LENGTH	7/8

PIPE SUPPORTS

PT NO	DESCRIPTION	DIA (NPD)
14	PIPE SUPPORT TYPE 21	8

PIECE MARKS

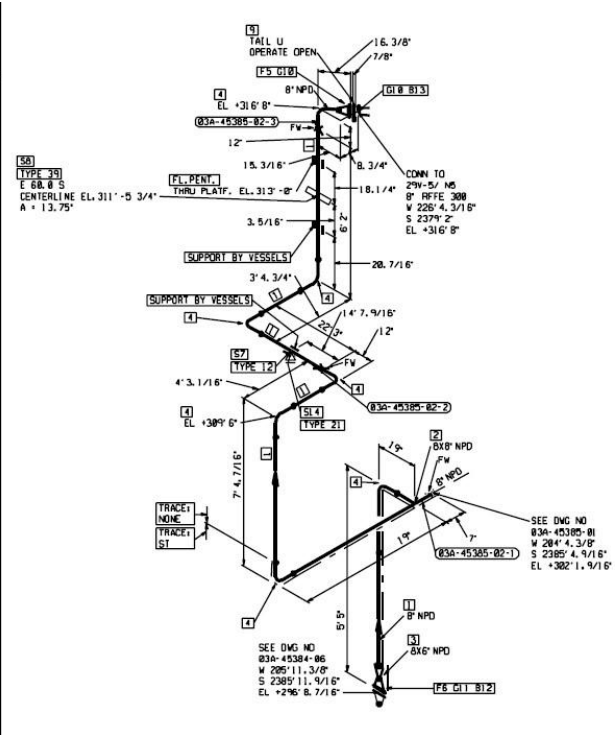
03A-45385-02-1 03A-45385-02-2 03A-45385-02-3

COMTY CODE

COMTY CODE	QTY
DT10025	30.0'
DT30245	1
DT302608	1
DT30215	7
DT20175	1
DT20390	1
TYPE12	1
TYPE39	1

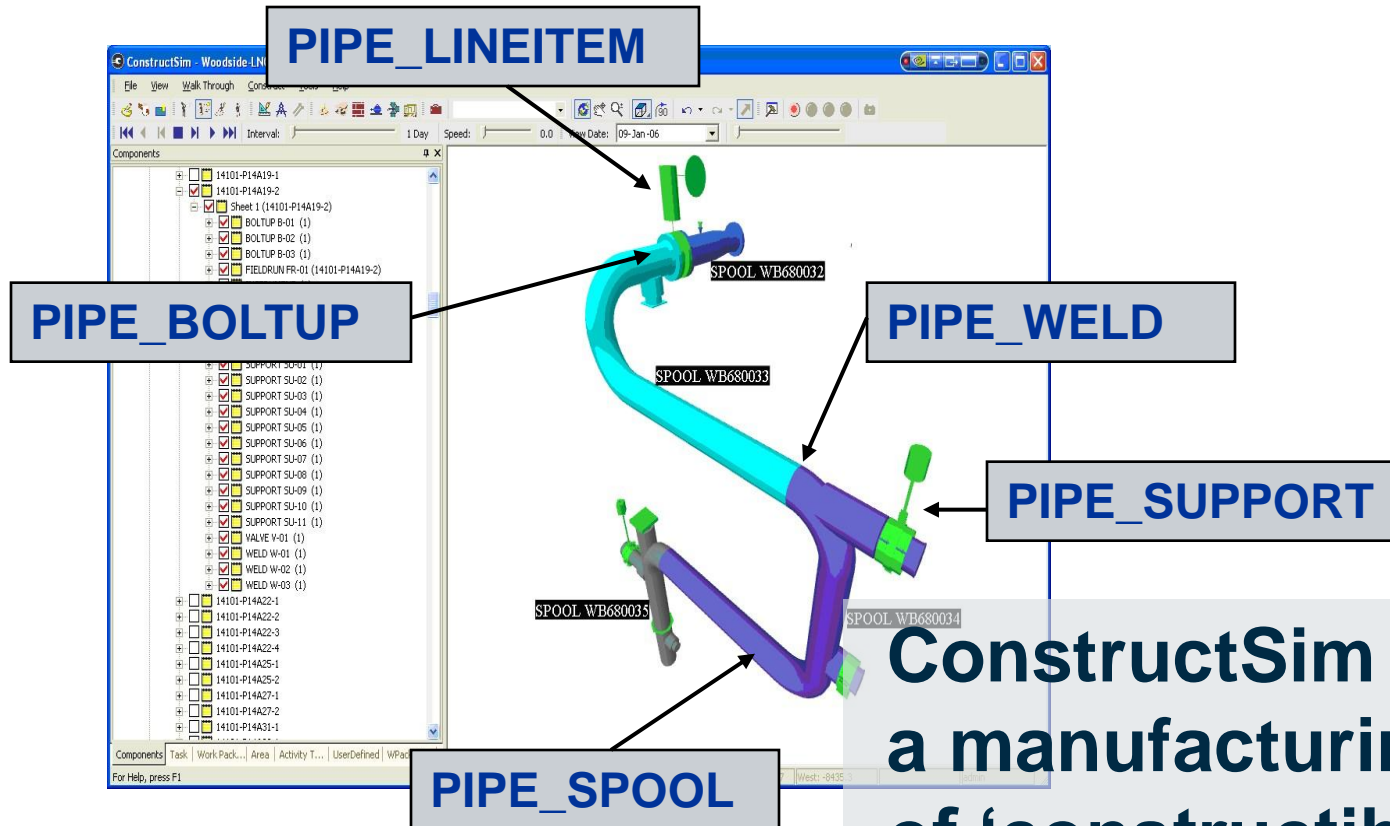
COMTY CODE

COMTY CODE	QTY
DT8203	1
RC126-3	2
RC463-7	1
CB7001	12
CB7001	12
TYPE21	1



Back

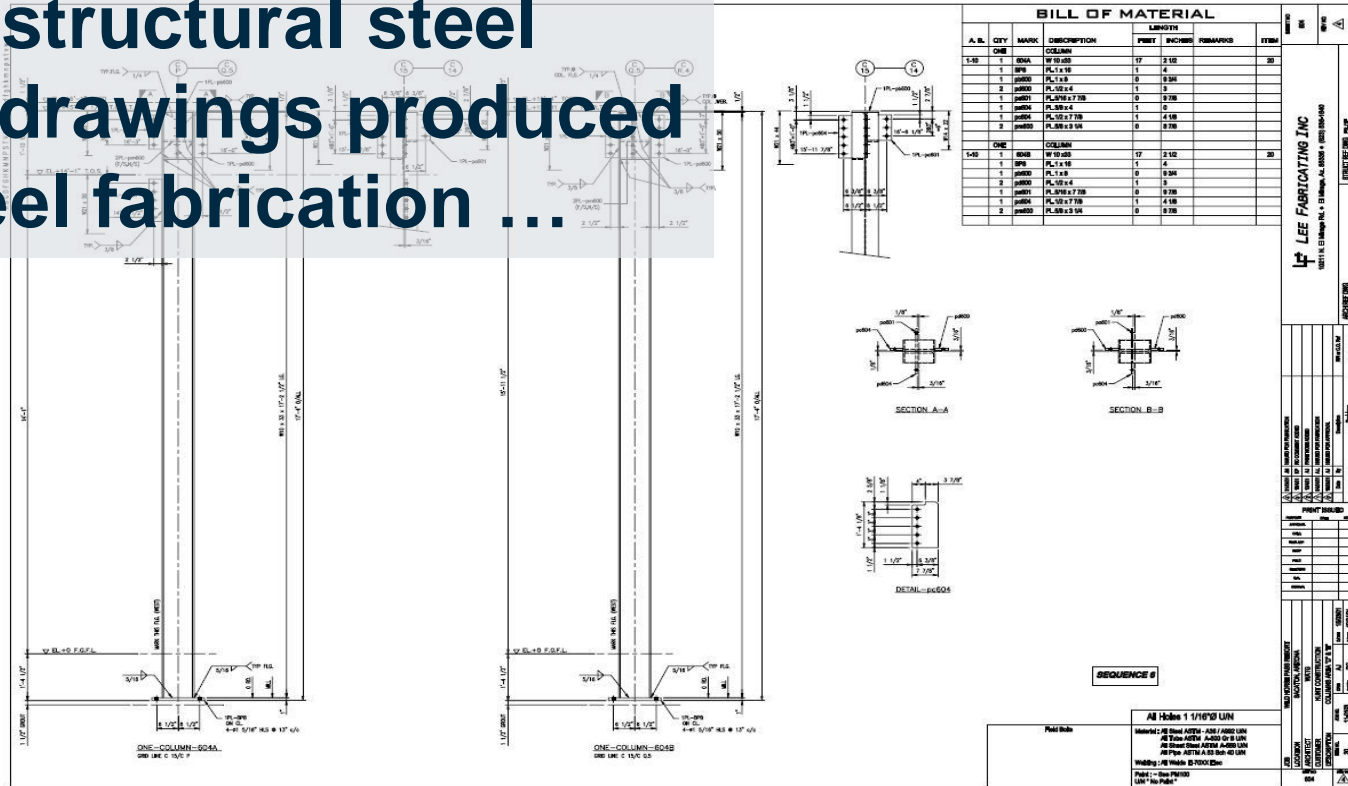
Data Aggregation – ISO Components



ConstructSim represents a manufacturing model of 'constructible' pipe elements.

Data Aggregation – Structural Details

ConstructSim
reads structural steel
detail drawings produced
for steel fabrication ...



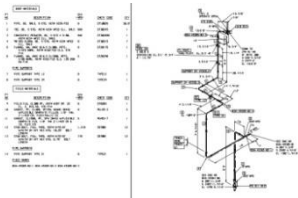
Back

Data Aggregation – Attributes

3D CAD Model



Digital Isometrics



Line List

Line No.	Line Size	Line Material	Line Class	Line Description	Line Status	Line Location	Line Notes
101	12"	Carbon Steel	Process	Process Line	Active	Process Area	
102	12"	Carbon Steel	Process	Process Line	Active	Process Area	
103	12"	Carbon Steel	Process	Process Line	Active	Process Area	
104	12"	Carbon Steel	Process	Process Line	Active	Process Area	
105	12"	Carbon Steel	Process	Process Line	Active	Process Area	
106	12"	Carbon Steel	Process	Process Line	Active	Process Area	
107	12"	Carbon Steel	Process	Process Line	Active	Process Area	
108	12"	Carbon Steel	Process	Process Line	Active	Process Area	
109	12"	Carbon Steel	Process	Process Line	Active	Process Area	
110	12"	Carbon Steel	Process	Process Line	Active	Process Area	

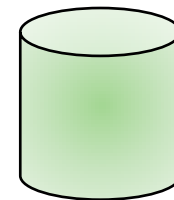
ConstructSim
Take-Off



ConstructSim

Attributes Sim
Classified Sim
attributes derived from
multiple sources
automated task
generation

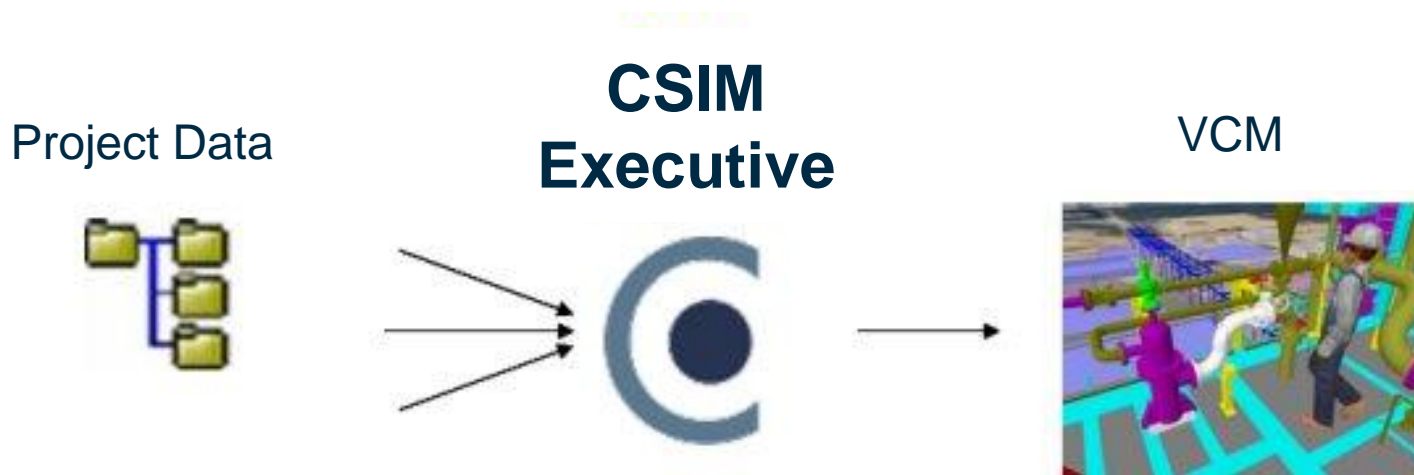
Other Sources



Back

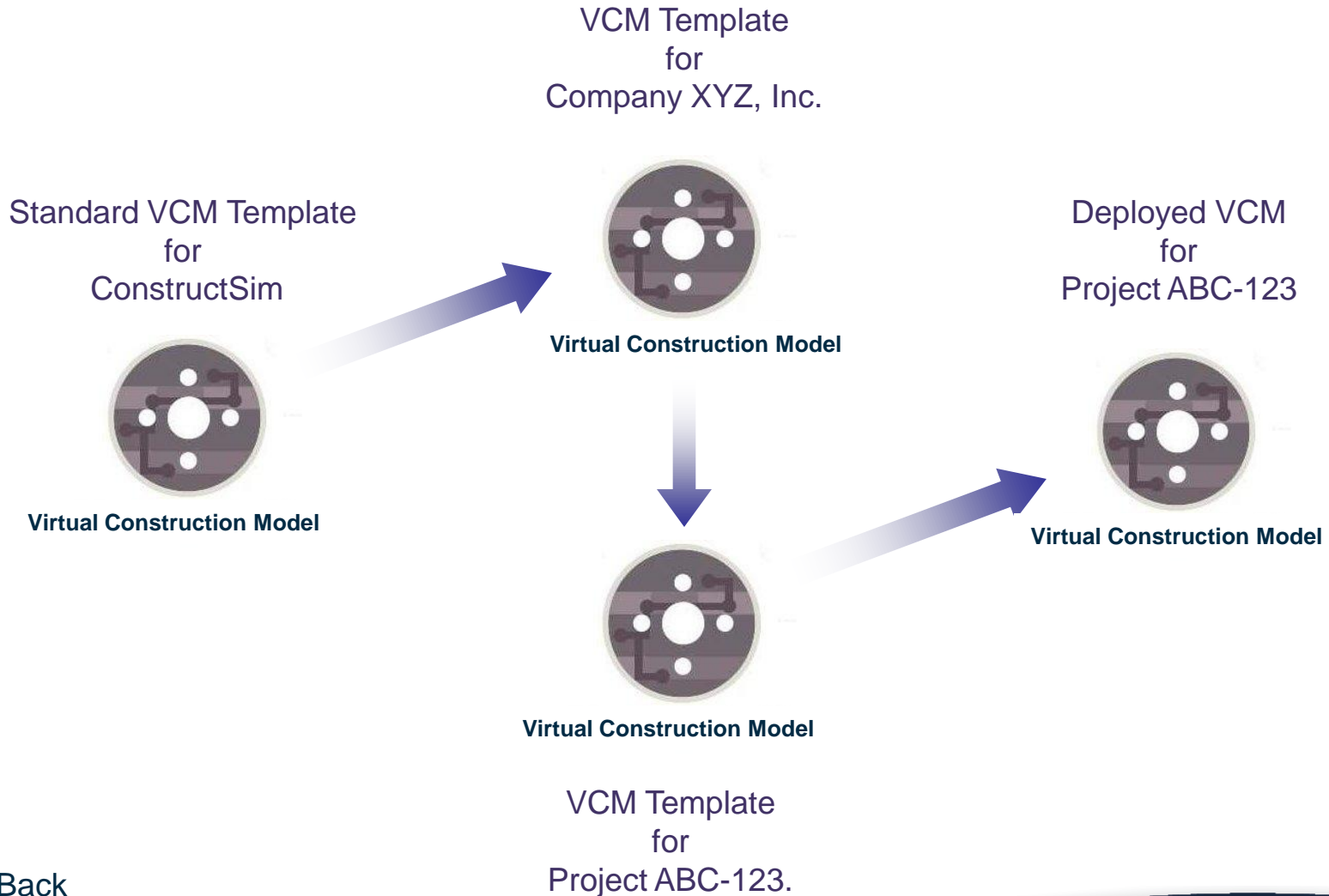
Data Aggregation – CSIM Executive

The *Virtual Construction Model (VCM)* is generated and updated by the **CSIM Executive** data processing engine. The ***Executive*** processes the *Project Data* as inputs and updates the *VCM* throughout the course of a construction project.



Back

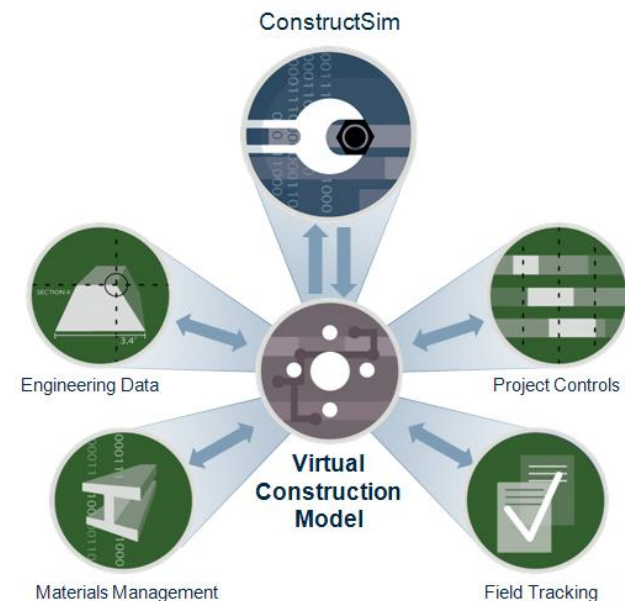
Data Aggregation – VCM Templates



Data Aggregation – Project Data

Typical Project Data input to ConstructSim on a project includes:

- 3D CAD
- Pipe Isometrics
- Structural Detailing Data
- Line List / Equipment List
- Instrument Index / Electrical Lists
- L3 Project Schedule
- Unit Rates/ Rules of Progress
- Offsite Fabricator Status
- Material Availability
- Quantity Tracking (Progress)
- Weld Tracking / NDE
- TO Systems / Completions

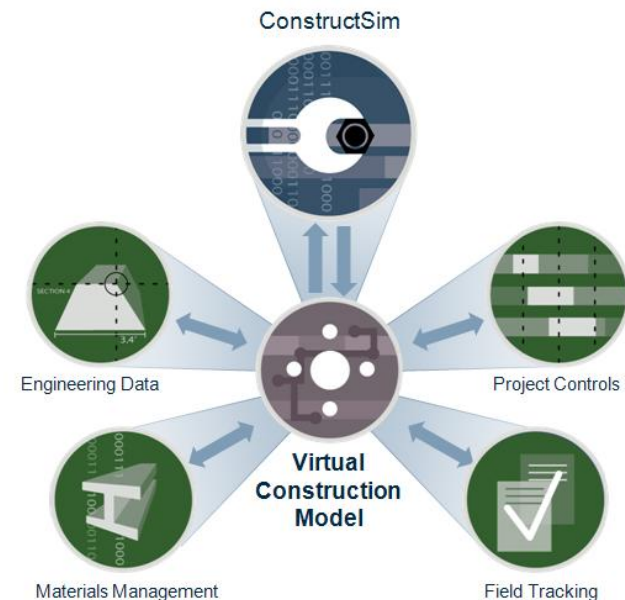


Back

Data Aggregation – Project Data

Typical Progressing Options:

- Use ConstructSim reports and data entry forms to track progress
 - Pipe
 - Receive
 - Fabricate
 - Install
 - Test
 - Steel
 - Receive
 - Install
 - Equipment
 - Receive, Install, MC

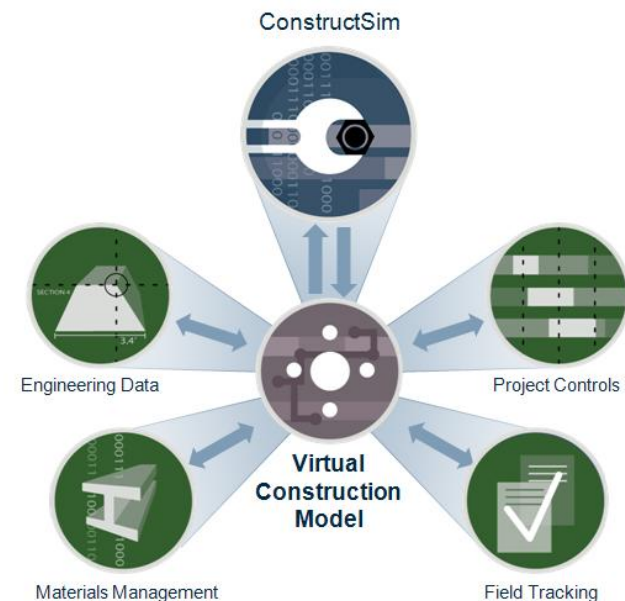


Back

Data Aggregation – Project Data

Typical Progressing Options:

- Interface with other electronic system
 - In-House / 3rd Party Commercial
 - Progressing – QTY Tracking
 - Material System
- Progressing XLS from sub-contractor
 - Validate list is correct
- Use ConstructSim to produce XLS sheet for sub-contractor, ask sub-contractor to submit progress in XLS format
 - Reduces in-accuracies

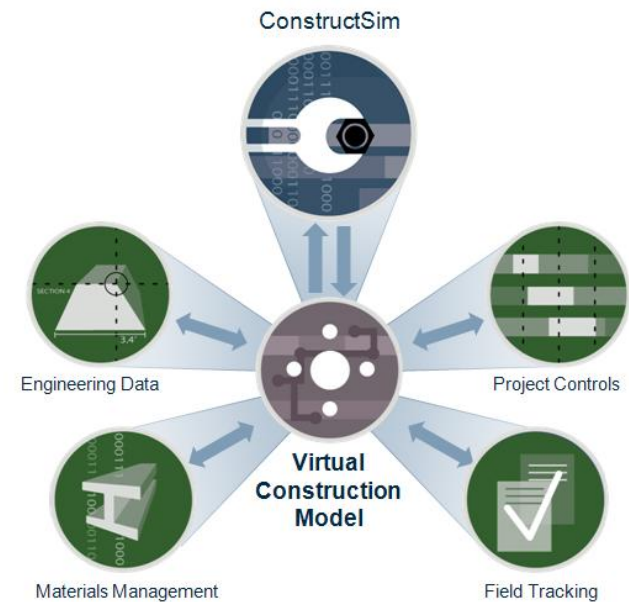


Back

Data Aggregation – Project Data

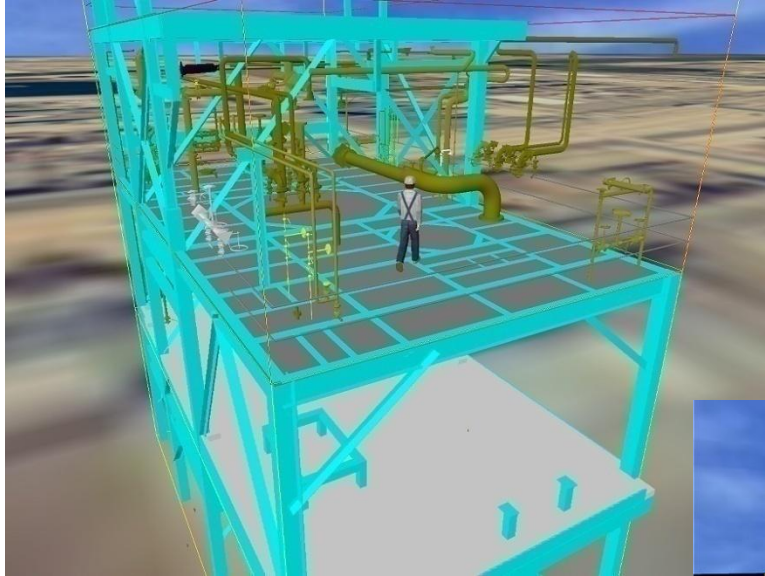
Typical Progressing Options:

- FUTURE – State-of-the-art active RFID hardware
 - R&D Project
 - Waseda University
 - Partner - Intelliwave

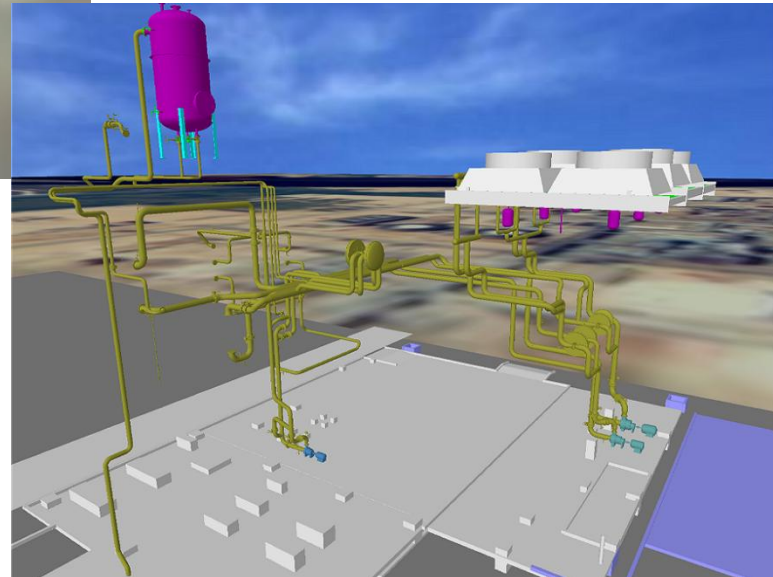


Back

Construction Planning – UD Groups



Turnover Systems



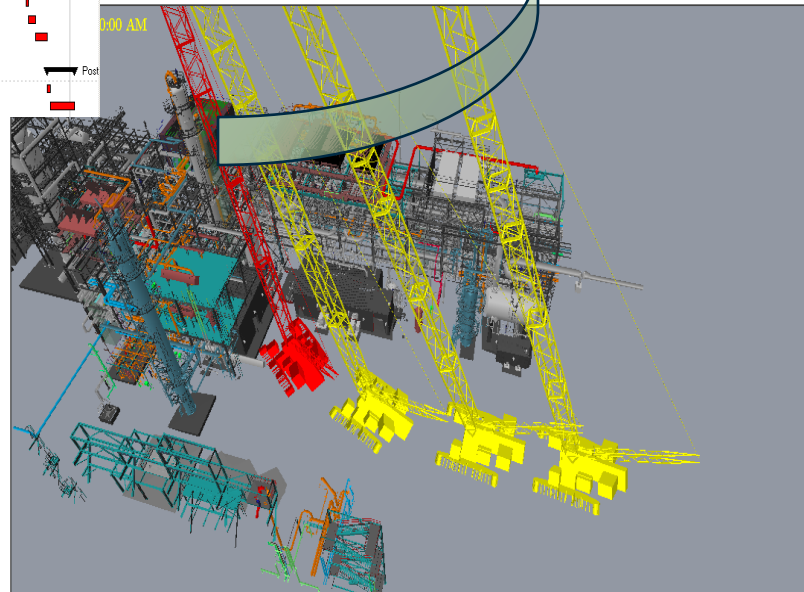
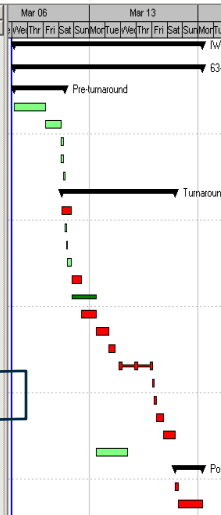
Construction Areas
Unit 1, Level 3
Large Bore, CS



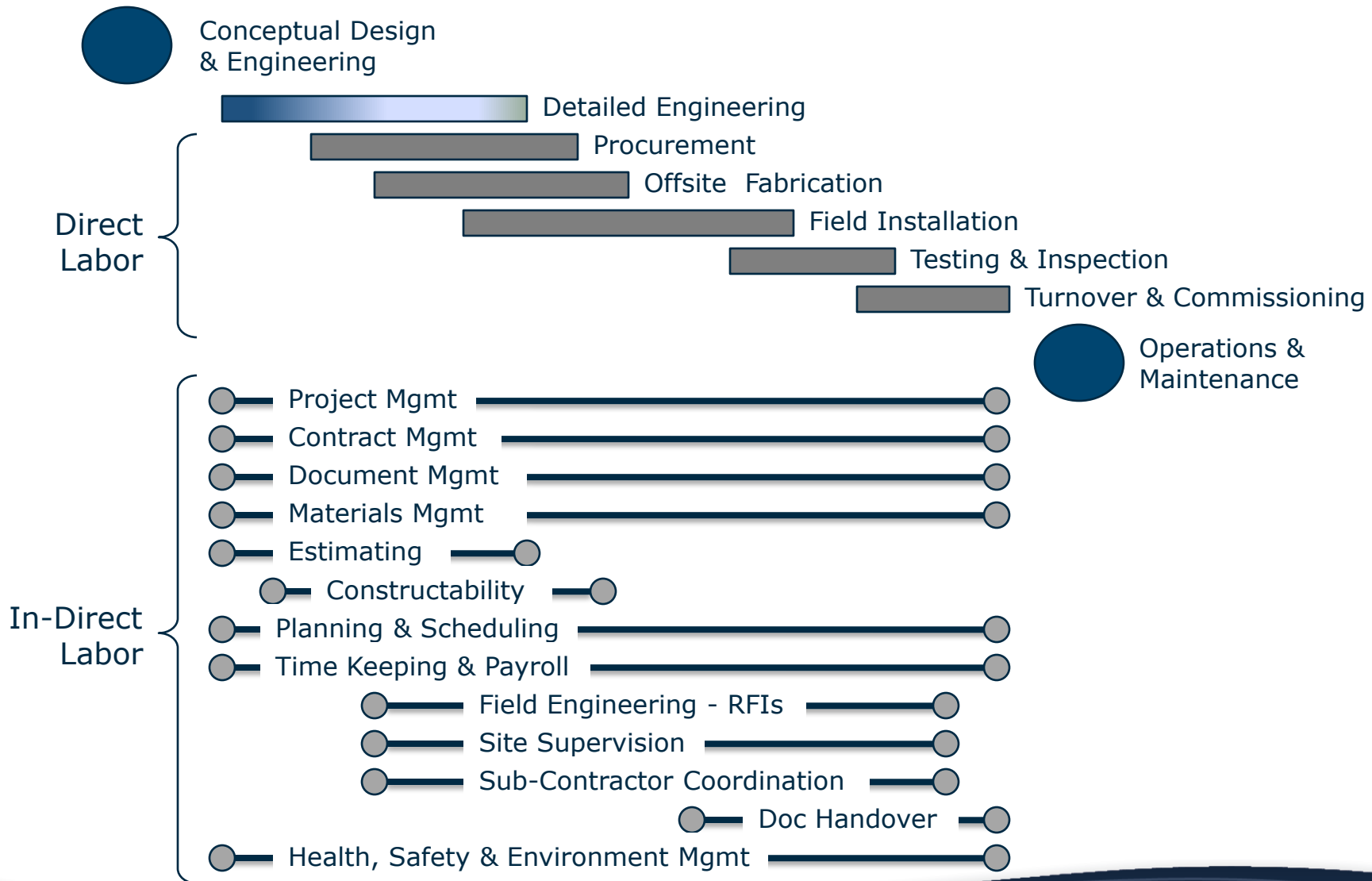
Back

Construction Planning – 4D Playback

Activity Name	Planned Duration	Tie In Point	CSim Activity Type	Resource Instance	Work Space	Labour Force
IWP: 0010	24h					60.00
63-TP-1012	24h					60.00
Pre-turnaround	66h					14.00
Install Temporary Platform	40h	63-TP-1012	Scaffold Build	Scaffold.01.0010		3.00
Remove Insulation & Install Temporary Cladding	20h	63-TP-1012	1.PieTA		63-TP-1012	4.00
Mark Tie-In Point Location and Confirm Dimensions	4h	63-TP-1012	1.PieTA		63-TP-1012	3.00
Conduct Positive Material Identification	4h	63-TP-1012	1.PieTA		63-TP-1012	2.00
Measure Wall Thickness	2h	63-TP-1012	1.PieTA		63-TP-1012	2.00
Turnaround	145h					28.00
Mobilize (Set Up) Crane	15h	63-TP-1012	Crane Place	Crane Crawler.0010		0.00
Gas Free & Safe	2h	63-TP-1012	2.TA.Demo		63-TP-1012	2.00
Lock Out/Tag & Obtain Permits	2h	63-TP-1012	2.TA.Demo		63-TP-1012	0.00
Prepare for Hot Works (Wind Screens & Fire Blankets)	8h	63-TP-1012	2.TA.Demo		63-TP-1012	6.00
Cold Cut and Prep for Welding	10h	63-TP-1012	2.TA.Demo		63-TP-1012	6.00
Crane Lifts	30h	63-TP-1012	Crane Lift	Crane Crawler.0010		0.00
Field Fit and Weld or Bolt-Up	20h	63-TP-1012	2.TA.Construct		63-TP-1012	6.00
Visual QA and Tag for Xray	15h	63-TP-1012	2.TA.Inspect		63-TP-1012	3.00
Post Weld Heat Treatment	10h	63-TP-1012	2.TA.Construct		63-TP-1012	2.00
Xray, Additional NDT if required	12h	63-TP-1012	2.TA.Construct		63-TP-1012	2.00
Hydro/Camber Test or Waiver/Service Test	2h	63-TP-1012	2.TA.Inspect		63-TP-1012	3.00
De-Bird/De-Tag and Reinstall	4h	63-TP-1012	2.TA.Construct		63-TP-1012	3.00
Final EPC Approval and Inspection	10h	63-TP-1012	2.TA.Inspect		63-TP-1012	2.00
Install Temporary Insulation	15h	63-TP-1012	2.TA.Construct		63-TP-1012	4.00
Demobilize Crane	40h	63-TP-1012	Crane Place	Crane Crawler.0010		0.00
Post-turnaround	34h					7.00
Install Insulation	4h	63-TP-1012			63-TP-1012	4.00
Tear Down Temporary Platform	30h	63-TP-1012	TearDown	Scaffold.01.0010		3.00



Construction Planning – Activities



Streamline Materials

The screenshot displays a software interface for material management. On the left, a 'Components' tree lists various items like C1S2, PDS, and multiple BOLT entries. The main area shows a 3D model of an industrial plant with colored piping. A 'Life Cycle Status Visualization' window is open, showing a table of material statuses and a 'Component Status' table.

Material Status	Component	ISO	Spe
Issued	SPOOL 00130-001-RF-D122	00130-001-RF-D12	D1:
Available - Partial	SPOOL 00130-001-RF-D121	00130-001-RF-D12	D1:
Available - None	SPOOL 00190-001-BD-A021		00
Available - Partial	SPOOL 00100-005-RF-D122		00
Available - None	SPOOL 00100-005-RF-D123		00
Issued	SPOOL 00100-005-RF-D121		00
Issued	SPOOL 00100-002-RF-D123	00100-002-RF-D12	D1:
Available - Full	SPOOL 00100-002-RF-D121		00
Available - None	SPOOL 00100-002-RF-D122		00
Available - Partial	SPOOL 00520-010-IW-A192		00
Issued	SPOOL 00520-010-IW-A191	00520-010-IW-A19	A1:
Reserved	SPOOL 00130-011-DR-A021	00130-011-DR-A02	A0:
Reserved	SPOOL 00130-008-DR-A021		00
Available - None	SPOOL 00520-009-LW-A191		00

Number of components listed: 172

Material Warehouse Status

Track Purchase Orders / ETAs

Track Allocation Priorities

Materials Issue Request

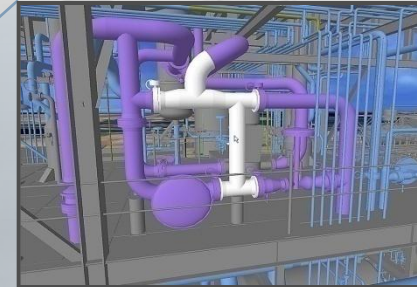


Quantity Tracking

Schedule



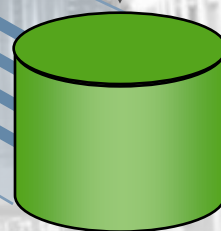
ConstructSim



MTO
From CAD +
Isometric Documents

ID	Description	Material	Unit	Rate	Cost
1					
2	14 UNLOAD & HANDLE 1' OF SHOP FAB SS PIPE	L	5136	6	36180
4	20 ERECT & CONNECT 1' OF SHOP FAB SS PIPE	L	5136	4	20544
5	34 HANGERS & SUPPORTS	L	5136	4	20544
6	48 SCAFFOLD	L	5136	4	20544
7	56 TEST	L	5136	4	20544
91	66 RESTITUTE	L	5136	4	20544
9	14 UNLOAD & HANDLE 1' OF SHOP FAB SS PIPE	L	5136	6	36180
10	20 ERECT & CONNECT 1' OF SHOP FAB SS PIPE	L	5136	4	20544
111	34 HANGERS & SUPPORTS	L	5136	4	20544
12	48 SCAFFOLD	L	5136	4	20544
13	56 TEST	L	5136	4	20544
141	66 RESTITUTE	L	5136	4	20544
15	14 UNLOAD & HANDLE 1' OF SHOP FAB CS PIPE	L	5136	6	36180
16	20 ERECT & CONNECT 1' OF SHOP FAB CS PIPE	L	5136	4	20544
17	34 HANGERS & SUPPORTS	L	5136	4	20544
18	48 SCAFFOLD	L	5136	4	20544
19	56 TEST	L	5136	4	20544
20	66 RESTITUTE	L	5136	4	20544
21	14 UNLOAD & HANDLE 6.75' SHOP FAB CS PIPE	L	5136	6	36180
22	20 ERECT & CONNECT 6.75' SHOP FAB CS PIPE	L	5136	4	20544
23	34 HANGERS & SUPPORTS	L	5136	4	20544
24	48 SCAFFOLD	L	5136	4	20544
25	56 TEST	L	5136	4	20544
28	66 RESTITUTE	L	5136	4	20544
27	14 UNLOAD & HANDLE 2' OF SHOP FAB CS PIPE	L	5136	6	36180

**Labor Rates &
Rules of Progress**

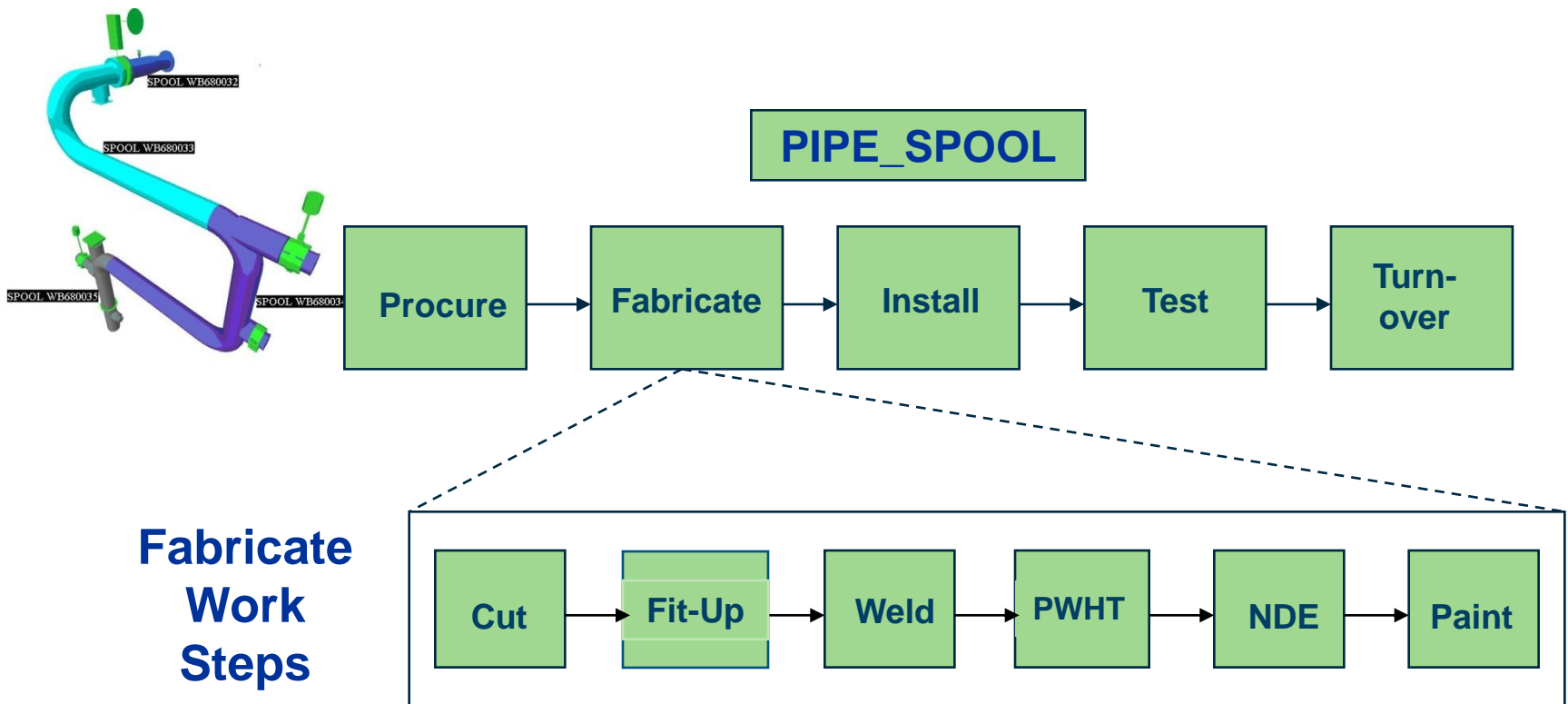


Work Steps



Quantity / Labor Tracking – Tasks

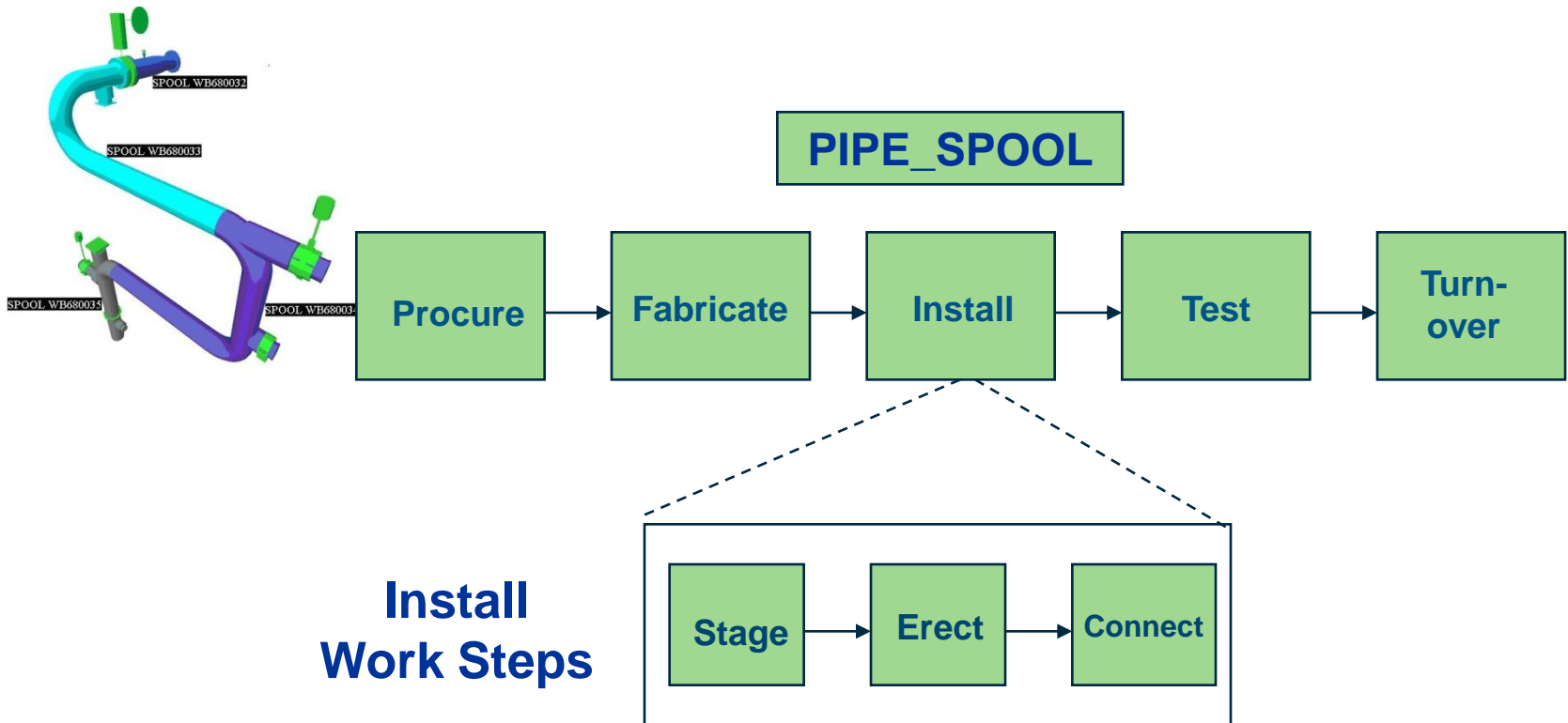
Tasks grouped by “activity type” and “component type”



Back

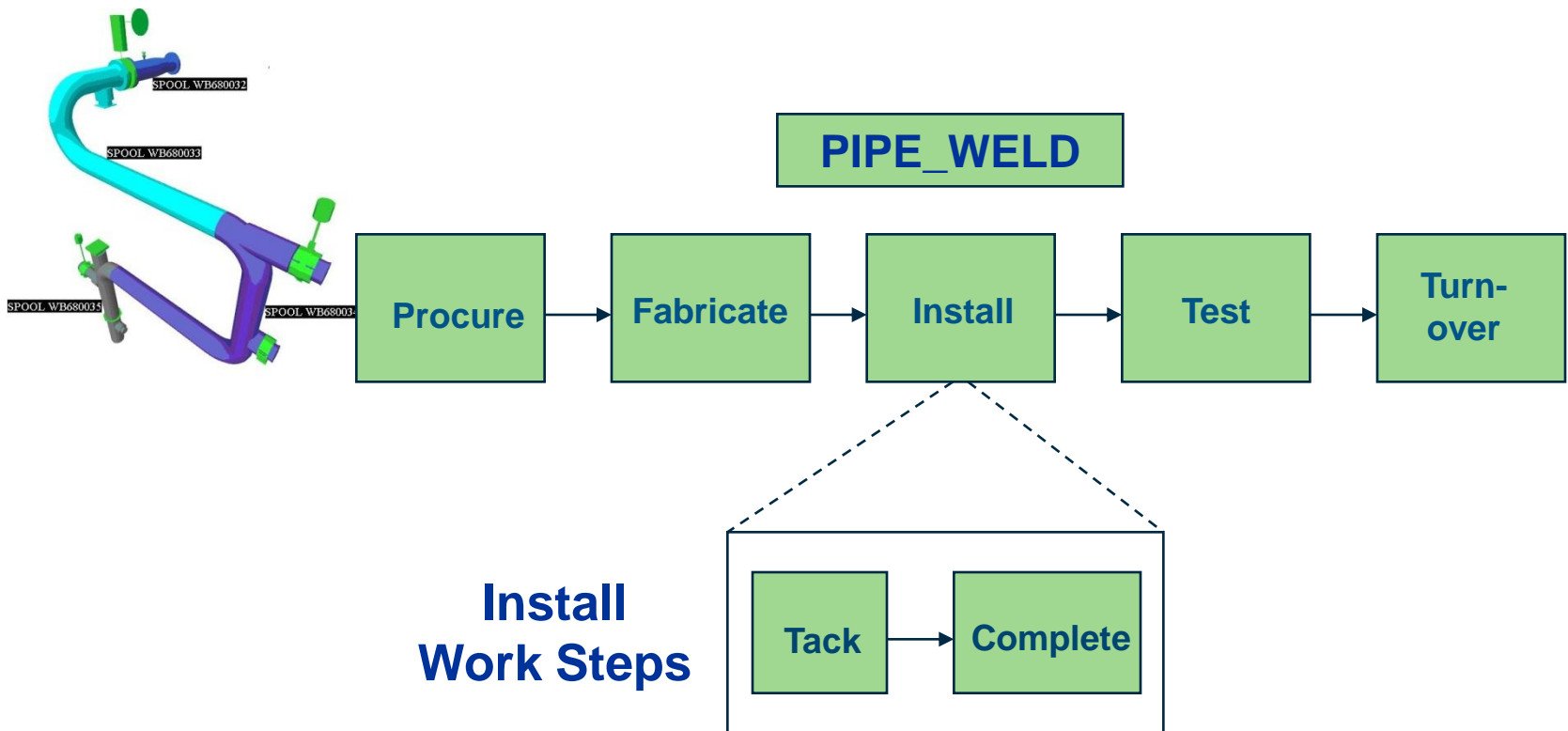
Quantity / Labor Tracking – Tasks

Tasks grouped by “activity type” and “component type”



Quantity / Labor Tracking – Tasks

Tasks grouped by “activity type” and “component type”



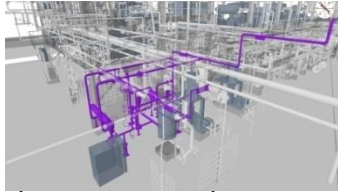
Levels of Planning & Scheduling

L3 - Schedule Activity

Example – A/G Piping Field Installation – Area 3A

ConstructSim “**Auto-links**” Model Components to L3 Activities By Attribute Matching Rules

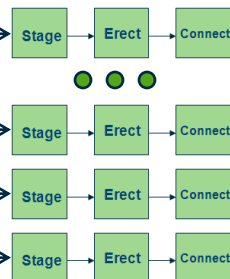
L4 – Crew Work Packs



Example – One “shift” of work (~1-2 weeks), includes scope identified with associated L5 tasks

Work face planner “**Builds**” optimal path of construction using ConstructSim

L5 - Tasks



Example – Spool 101-A Erect, Fit-Up, Connect

ConstructSim “**Auto-Generates**” L5 Tasks from Template “Rules of Progress”

Virtual Work Packs

Construction Work Package - New

Selected Item(s):
SPOOL 03C-45440-02-1

Component List:

Title	Type	Selection Level
BOLTUP 8-01 RGA01-7 (03C-4546...	PIPE_BOLTUP	Pipe
BOLTUP 8-02 RGA01-7 (03C-4546...	PIPE_BOLTUP	Component
INSTRUMENT 29TE-0635 (03C-45...	PIPE_LINEITEM	
MISCCOMPONENT MC-01 CB8017...	PIPE_LINEITEM	
MISCCOMPONENT MC-02 CB8209...	PIPE_LINEITEM	
SPOOL 03C-45440-02-2	PIPE_SPOOL	
SPOOL 03C-45460-01-1	PIPE_SPOOL	
SPOOL 03C-45460-01-2	PIPE_SPOOL	
WELD W-01 (03C-45460-01)	PIPE_WELD	

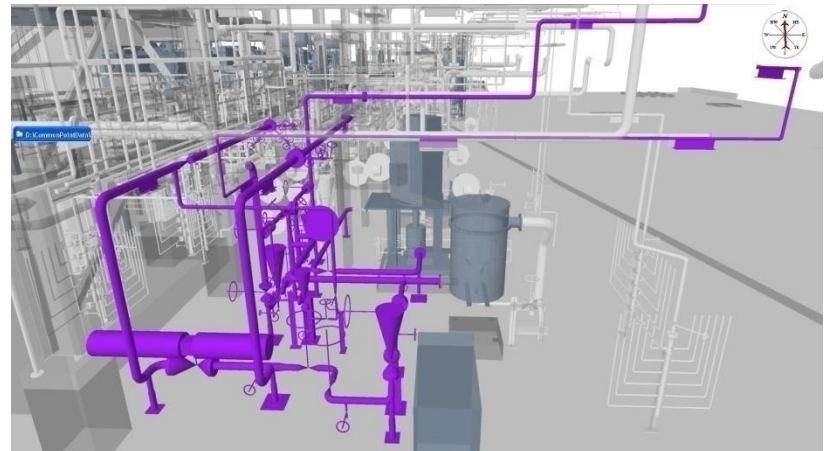
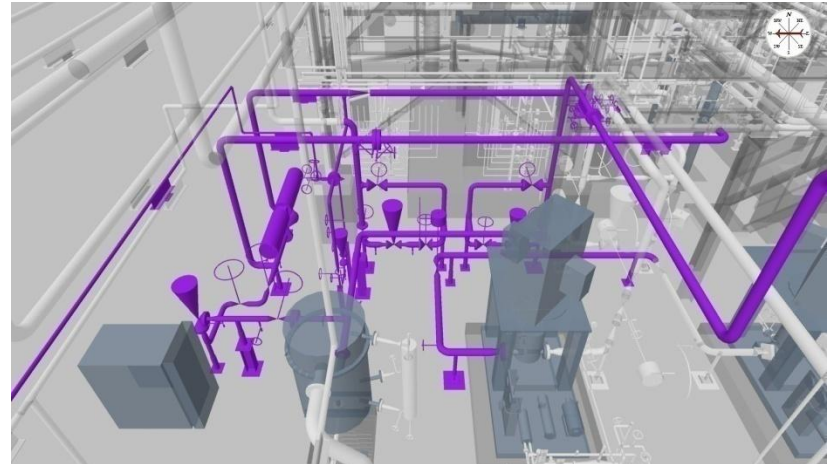
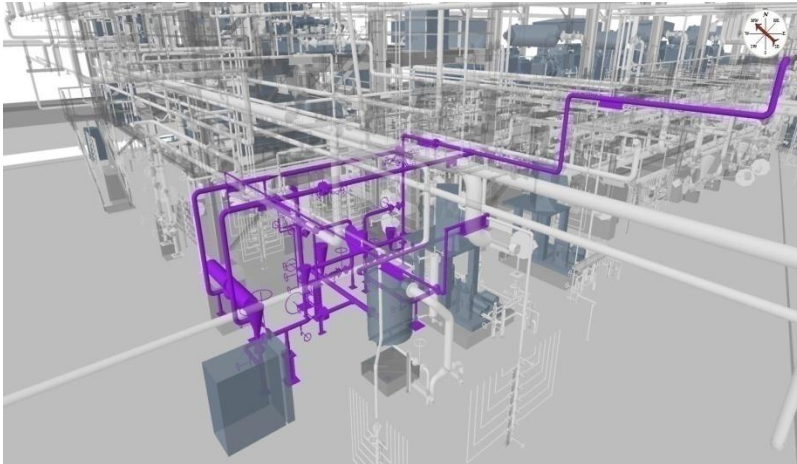
Task List: Tasks: 15, Hrs: 149.062, LF: 85,387, TN: 0.000, EA: 0

ISO	TASK TITLE	QTY	UDM	BDGT HRS	KIC T&Off	Cost Code	Cost Cc
03...	Rule 2 - ST...	13...	LF	1,121,236	SPOOL ...	3600.21	A1 LB !
03...	Rule 4 - FL...	13...	LF	7,848,853	SPOOL ...	3600.21	A1 LB !
03...	Rule 3 - ER...	13...	LF	10,091,126	SPOOL ...	3600.21	A1 LB !
03...	Rule 1 - FL...	16...	DI	28,800,000	WELD ...	3620.21	A1 LB \
03...	Rule 3 - ER...	43...	LF	32,777,774	SPOOL ...	3600.21	A1 LB !
03...	Rule 2 - ST...	43...	LF	3,641,975	SPOOL ...	3600.21	A1 LB !
03...	Rule 4 - FL...	43...	LF	25,459,824	SPOOL ...	3600.21	A1 LB !
03...	Rule 1 - FL...	0...		0.000000			
03...	Rule 1 - FL...	0...	DI	0.000000			

Buttons: Add, Remove, Configure..., Re-Apply Color, Save & Create New..., Save & Exit..., Cancel

Added 3 Task(s) to the Work Package.

Virtual Work Packs – 4 Views



Back

Virtual Work Packs - Reports

ConstructSim - Work Package Execution Reports


Set Work Pack Type: Work Package:

Pipe::Install

Filter Work Pack List:

Set Report Type:

Field Materials

Document Type
 Reports To Print 

4/8/2009

	ISO	Mat'l Code	Material Description	Bore	Mat'l	Qty
PI-FIWP-CellarDeck-Above-001						
PI-FIWP-CellarDeck-Above-002						
PI-FIWP-CellarDeck-Above-004	00120-031-GY-A19	I4023191	STUD BOLTS & 2 HEAVY HEX. NUTS ASME B18.2.1 / ASME B18.2.2, 95.0MM BOLT LENGT	4	LTCS	8
PI-FIWP-CellarDeck-Above-005	00120-031-GY-A19	I2575937	CAP ASME B16.11 FTE	0.75	LTCS	0.04
PI-FIWP-CellarDeck-Below-001	00120-031-GY-A19	I3155766	SPIRAL WOUND GASKET ASME B16.20 RFTBE	4	LTCS	1
PI-FIWP-CellarDeck-Below-002	00120-031-GY-A19	BUG SCREEN FL	PIPING SPECIALTY	4	LTCS	1
PI-FIWP-CellarDeck-Below-003						
PI-FIWP-MainDeck-Below-001	00540-002-DR-A02	I2242408	STUD BOLTS & 2 HEAVY HEX. NUTS ASME B18.2.1 / ASME B18.2.2, 85.0MM BOLT LENGT	2	CS	16
PI-FIWP-MainDeck-Below-002	00540-002-DR-A02	I3155567	SPIRAL WOUND GASKET ASME B16.20 RFTBE	2	CS	4
PI-FIWP-Wellhead-001	00540-002-DR-A02	00540-LT-110	PIPING SPECIALTY	2	CS	1
PI-FIWP-Wellhead-002						
PI-FIWP-Wellhead-003	00550-016-DR-A02	I2242408	STUD BOLTS & 2 HEAVY HEX. NUTS ASME B18.2.1 / ASME B18.2.2, 85.0MM BOLT LENGT	2	CS	16
PI-FIWP-Wellhead-004	00550-016-DR-A02	I3155567	SPIRAL WOUND GASKET ASME B16.20 RFTBE	2	CS	4
PI-FIWP-Wellhead-005						
PI-FIWP-Wellhead-006	00550-016-DR-A02	00550-LT-110	PIPING SPECIALTY	2	CS	1
PI-FIWP-Wellhead-007	00550-016-DR-A02	I3155590	VALVE BALL FLANGED ENDS LONG PATTERN API 6D SPLIT BODY / REDUCED BORE / FI	2	CS	1
PI-FIWP-Wellhead-008	00550-017-DR-A02	I2242408	STUD BOLTS & 2 HEAVY HEX. NUTS ASME B18.2.1 / ASME B18.2.2, 85.0MM BOLT LENGT	2	CS	16
	00550-017-DR-A02	I3155567	SPIRAL WOUND GASKET ASME B16.20 RFTBE	2	CS	4
	00550-017-DR-A02	00550-LT-120	PIPING SPECIALTY	2	CS	1
	00550-017-DR-A02	I3155590	VALVE BALL FLANGED ENDS LONG PATTERN API 6D SPLIT BODY / REDUCED BORE / FI	2	CS	1



Back

Virtual Work Packs - Reports



Steel Piecemark Counts



Steel PieceMarks: ST-FIWP-CellarDeck-012

Piecemark	Cnt	Total Weight	Function	Part Size	Len	Thk	Bolt Details
A/15	1	0.032	Plate	Plate (Rect. 1.64x1.02)	19.68	0.48	
A/16	2	0.032	Plate	Plate (Rect. 1.02x0.8)	12.24	0.48	
A/2	1	0.492	Plate	Plate (Complex)	0.00	1.20	
A/20	2	0.007	Plate	Plate (Complex)	0.00	0.60	
A/22	4	0.048	Plate	Plate (Complex)	0.00	0.60	
A/3	1	0.492	Plate	Plate (Complex)	0.00	1.20	
A/31	2	0.038	Plate	Plate (Rect. 1.44x0.56)	17.28	0.60	
A/6	2	0.160	Plate	Plate (Complex)	0.00	0.84	
B/1176	1	0.673	Beam	HEA360	107.28	0.00	
B/1179	1	1.232	Beam	HEA360	196.44	0.00	
B/1181	1	0.695	Beam	HEA360	110.88	0.00	
B/1582	1	0.338	Beam	IPE 240	196.68	0.00	
B/1725	1	0.110	Beam	HEA220	39.00	0.00	
B/24	1	1.638	Beam	HEA360	261.24	0.00	
B/25	1	0.474	Beam	HEA280	110.88	0.00	
B/58	1	1.499	Beam	HEA360	238.92	0.00	
B/6	1	1.578	Beam	HEA360	251.52	0.00	
B/60	1	1.032	Beam	HEA360	164.52	0.00	
B/646	4	1.352	Beam	IPE 240	196.44	0.00	
B/647	5	0.955	Beam	IPE 240	110.88	0.00	
B/66	1	0.840	Beam	HEA280	196.44	0.00	
B/87	2	0.056	Beam	Plate (Rect. 0.88x0.98)	11.76	0.84	

Total Weight: 13.8



Back

Virtual Work Packs - Reports

Work Pack Stats displays a list of all the work packages, with quantities and associated hours.

ConstructSim Status Tracking - User Interface

Project: [Dropdown]

Admin logged in at 11:20:21 AM

- Engineering Quantities
- Materials Availability
- Work Face Planning
 - Set-Up Project Personnel
 - Work Pack Stats**
 - Work Pack Execution Reports
 - Look-ahead Planning Utility
 - Task Review and Progress Er
- Work Pack Data
- 4D Playback
- Systems Turnover
- Progress Reports
- Custom
- CSST-User Set-Up

Work Pack Stats

Work Pack	Hrs	Length	Quantity Counts				
			Spools	Valves+	Supt's	Welds	Bolt-Ups
IP02304ALBCS_005	391.1	107.20	7	2	9	3	2
IP023R03ALBCS_001	508.4	133.08	5	0	18	7	0
IP023R03ALBCS_002	478.6	131.35	5	0	11	8	0
IP023R03ALBCS_003	396.1	105.44	5	1	12	6	1
IP023R03ALBCS_004	524.5	146.39	4	0	12	1	0
IP023R03BLBCS_008	424.8	121.65	4	0	6	2	1
IP023R03BLBCS_009	494.0	237.00	12	16	24	8	5
IP023R03MLBCS_005	495.1	135.17	11	0	11	12	0
IP023R03MLBCS_006	481.1	131.58	10	1	8	10	7
IP023R03MLBCS_007	488.9	134.34	6	0	12	5	0
IP023R03MLBCS_010	472.5	155.94	13	7	13	10	2
IP023R03MLBCS_011	493.3	144.65	11	3	18	11	0
IP023R04ALBCS_001	470.5	128.40	3	0	12	6	0
IP023R04ALBCS_002	444.5	126.70	4	0	8	0	0



Back

Status Visualization

Status information
from task progress
or from external
data sources

No Progress	■
Received	■
Staged	■
Erected	■
Final Complete	■
Punch Complete	■

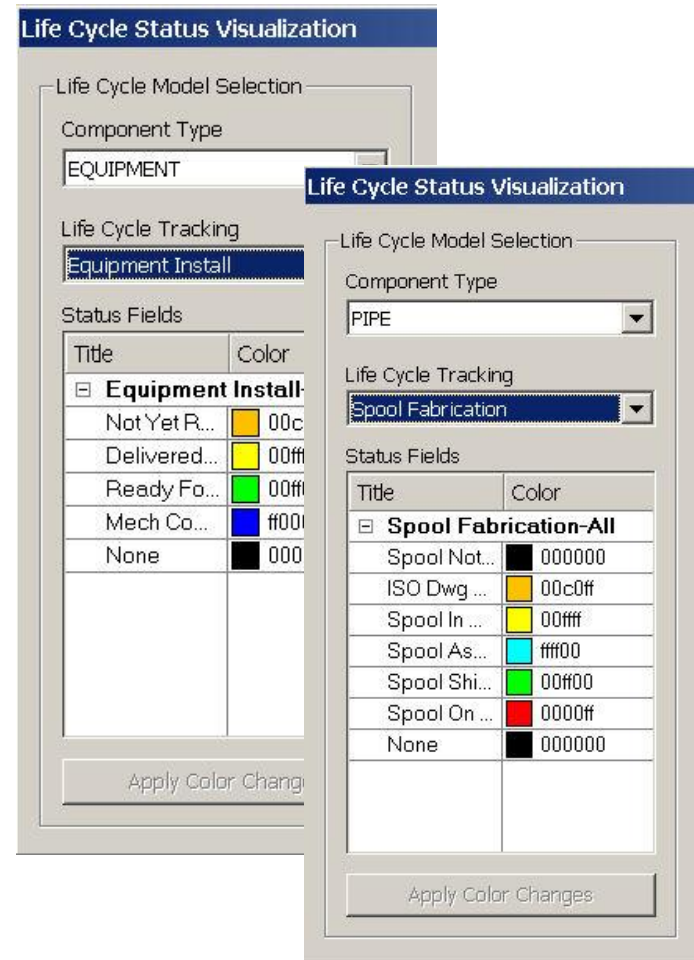


Back

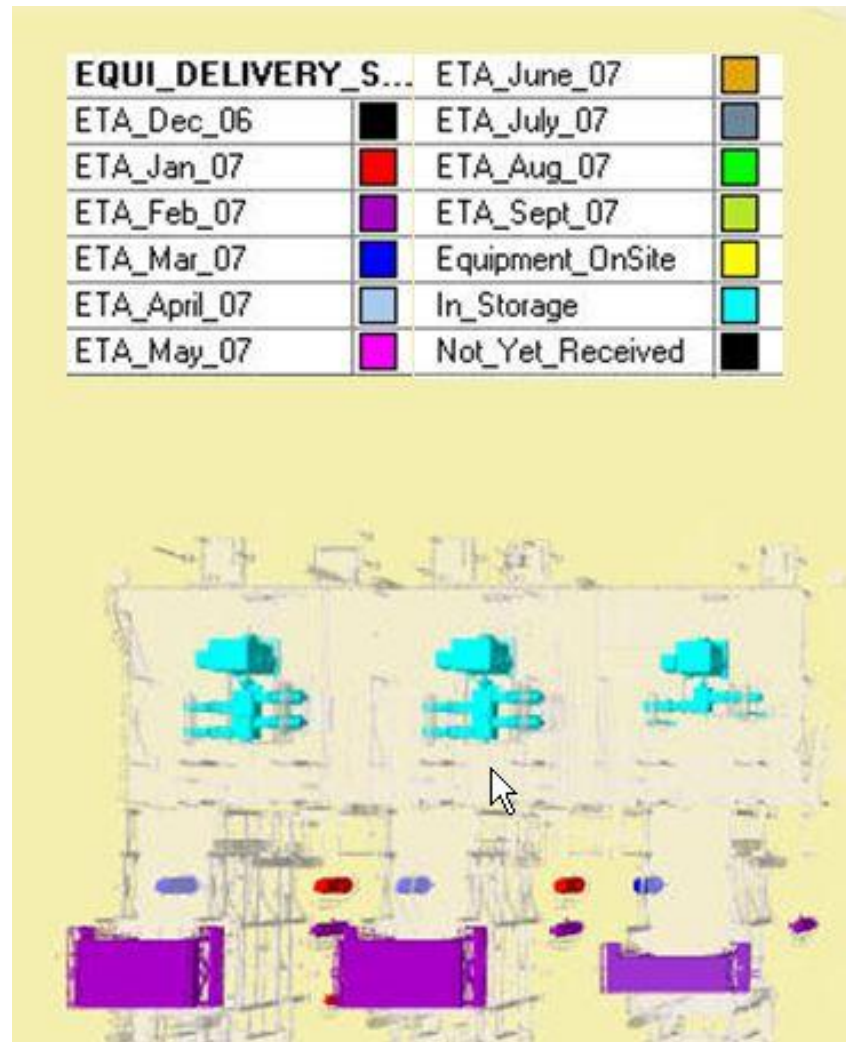
Status Visualization – Standard Modes

- Spool fabrication
- Equipment installation
- ISO release status
- Pipe material availability
- Advance revision notices
- Work step tracking
- Test pack status
- QA/QC status
- Work package constraints

Project / user specific status modes can also be created.

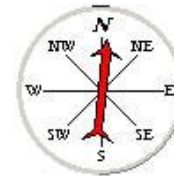
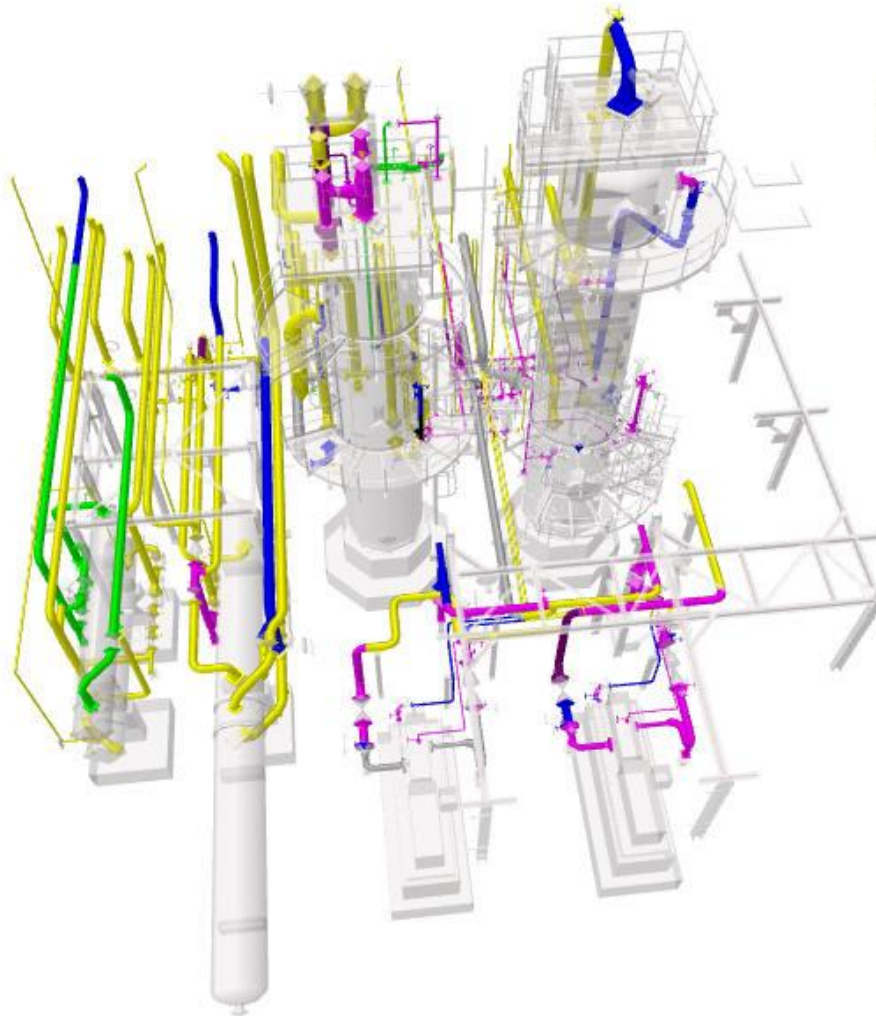


Status Visualization – Equip Delivery



Back

Status Visualization – Pipe Fab



Area 15

SPPOOL_Delivery_St...

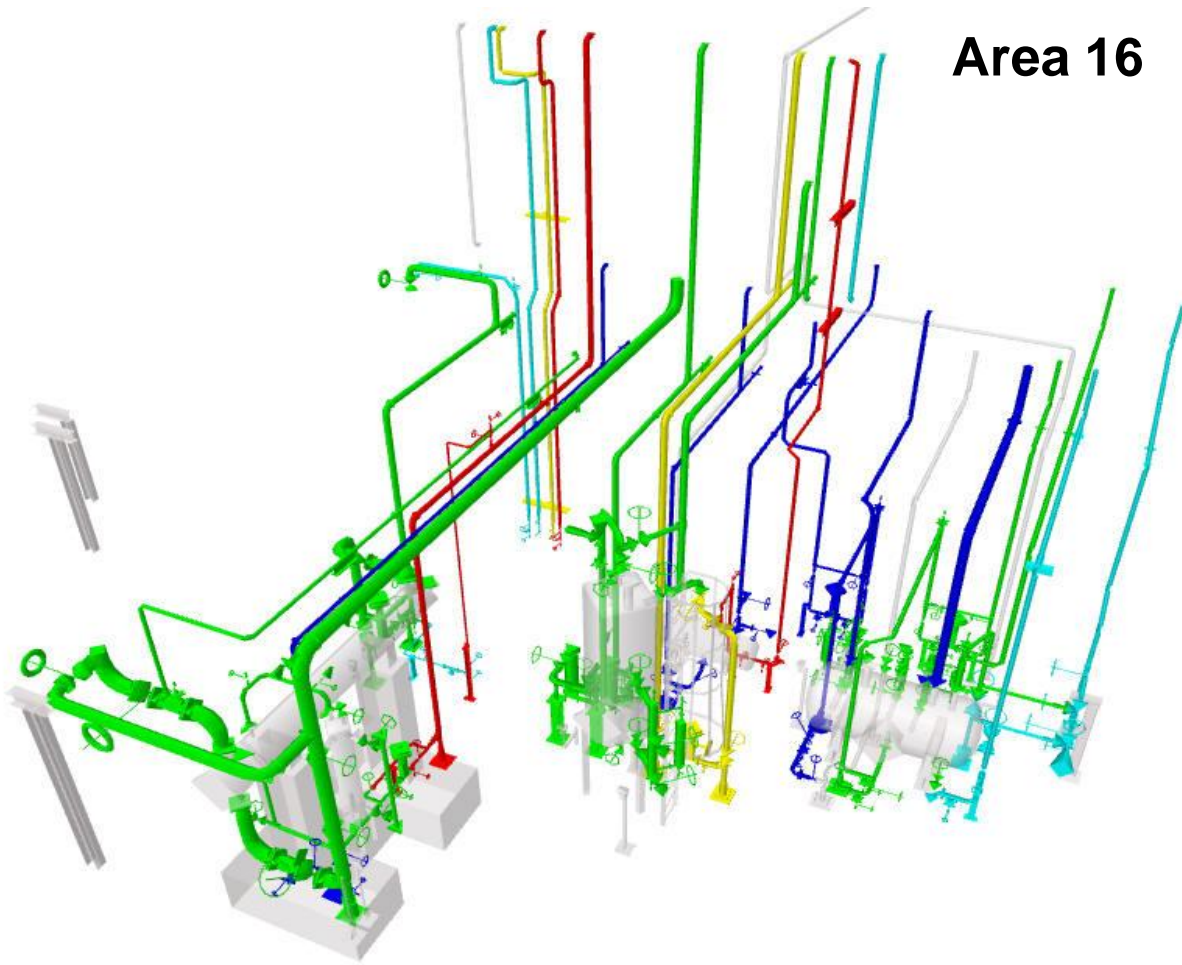
ETA_3+WEEKS	Grey
ETA_2WEEKS	Cyan
DUE	Green
PASS_DUE_2WEE...	Magenta
PASS_DUE_3+WE...	Purple
SHIPPED	Blue
ONSITE	Yellow
ON_HOLD	Red
NO_DATE	Black



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Status Visualization – Test Status

Area 16

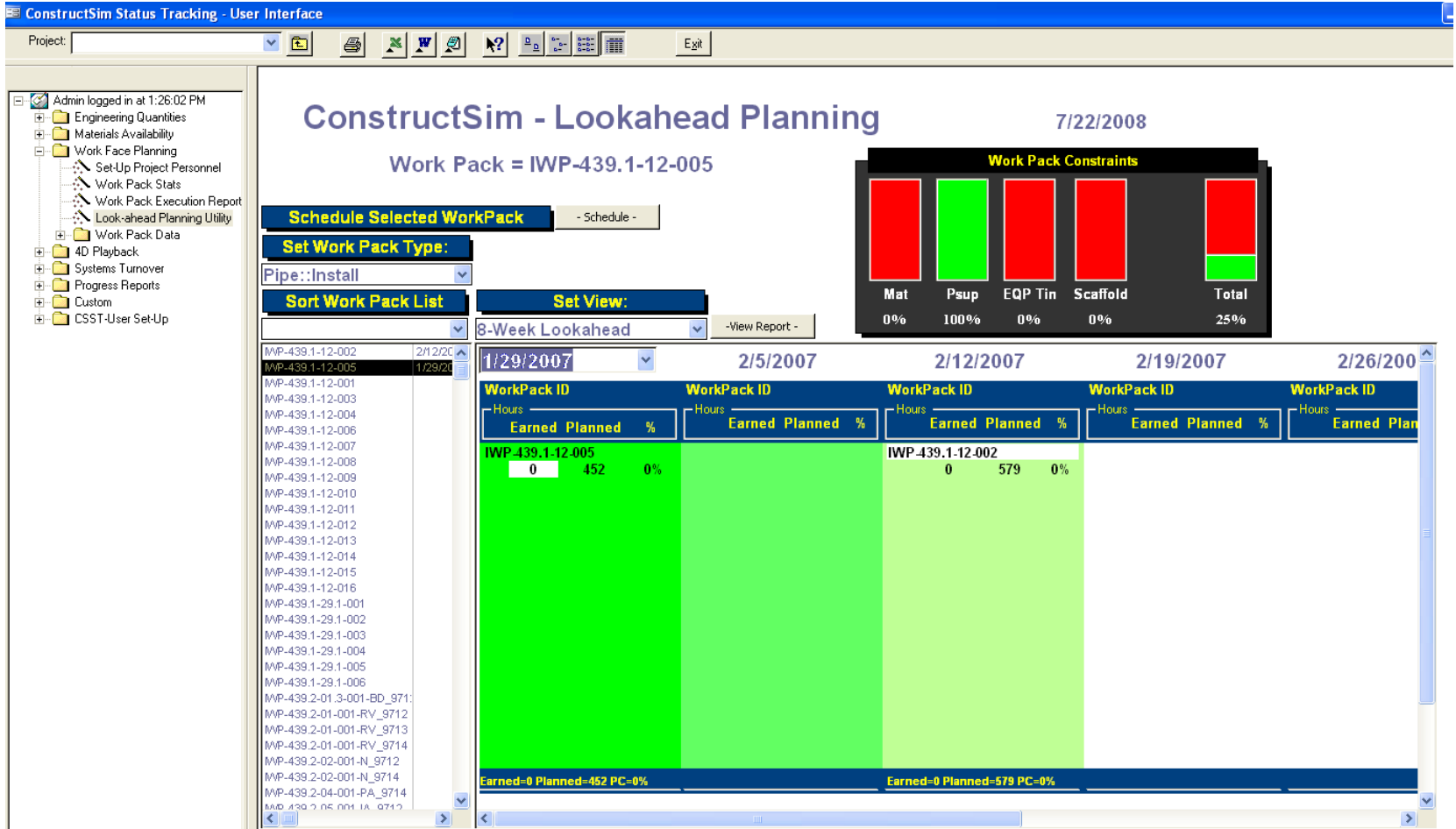


PIPE_TEST_PROGRE...	
PUNCHLIST_GENERA...	Grey
GIVEN_TO_CLIENT	Yellow
NDE_COMPLETE	Cyan
TEST_COMPLETE	Blue
PAINT_COMPLETE	Green
HEATTRACE_COMPL...	Magenta
INSUL_COMPLETE	Purple
No Progress	Red



Back

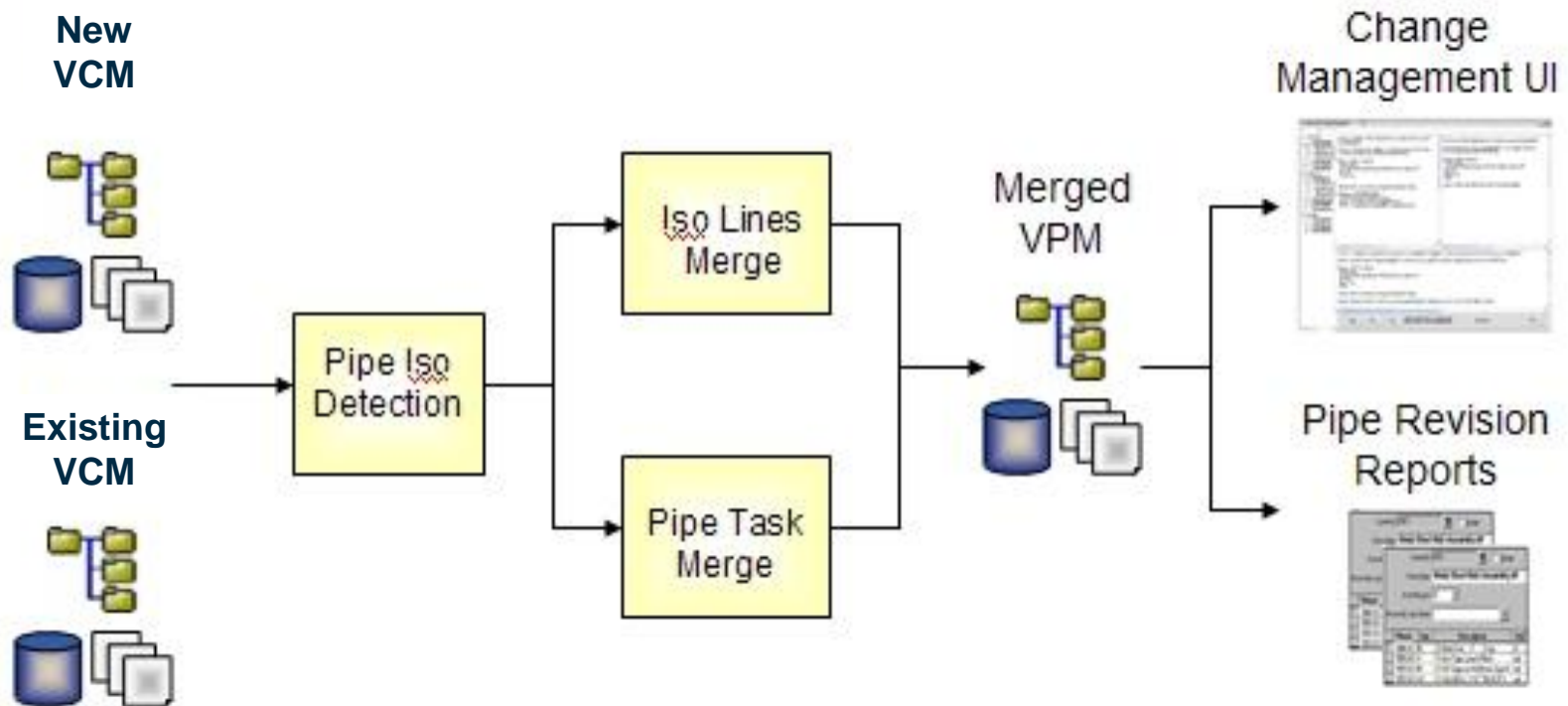
Look-Ahead Planning



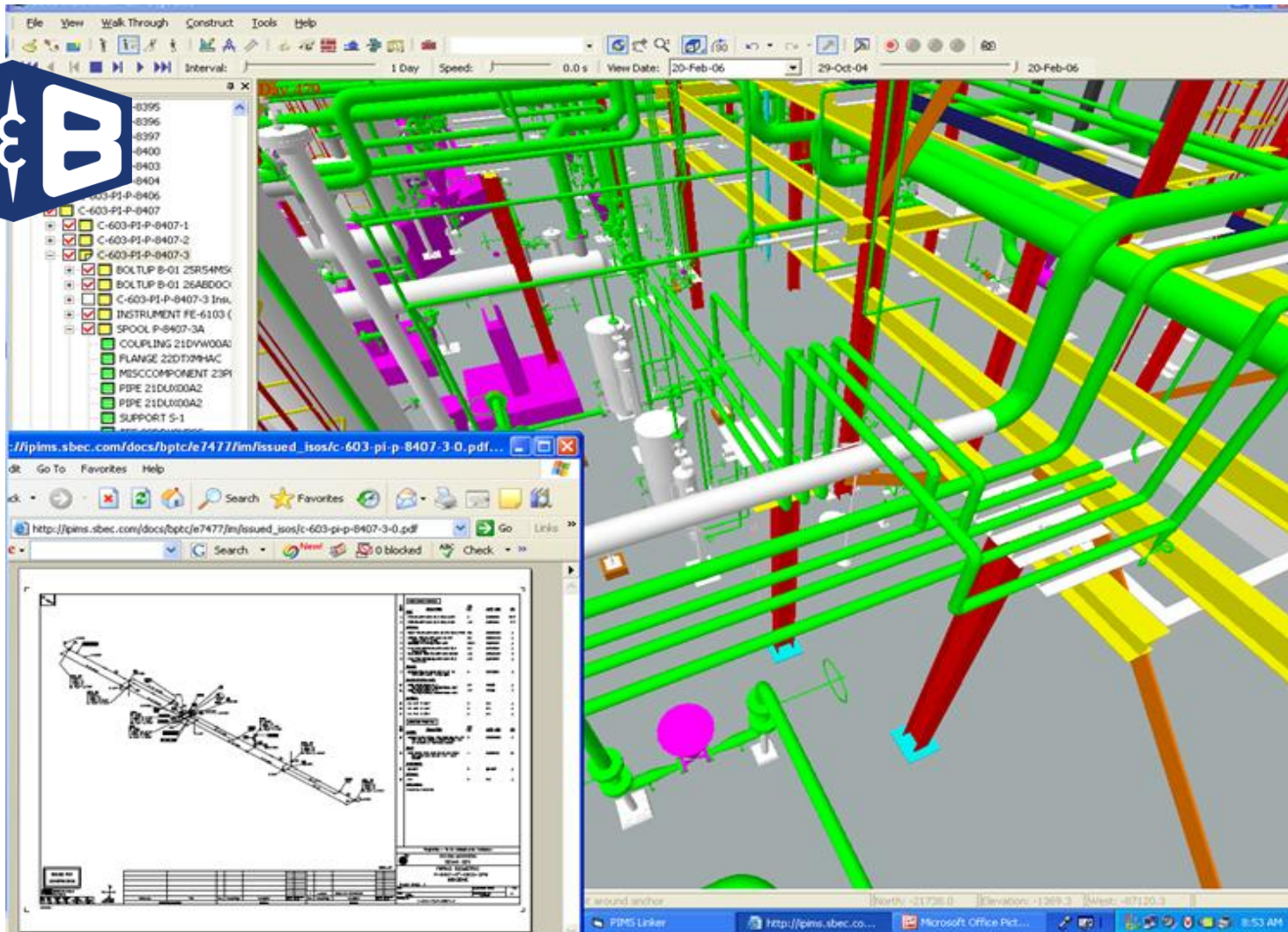
Back

Change Management

ConstructSim keeps track of the changes in pipe isometrics and propagates the changes throughout the Virtual Construction Model



Document Linker



Progress Reports

Pipe Progress Tracking By Area

1/17/2006 ConstructSim

ConstructSim - Pipe Progress By Area

Drop Filter Fields Here Drop Column Fields Here

AREA	Matl	Size	LF-Bdgt	LF-Earn	Welds-Bdgt	Welds-Earn	BoltUp-Bdgt	BoltUp-Earn	Supp-Bdgt	Supp-Earn	Valve-Bdgt	Valve-Earn	Spltem-Bdgt	Spltem-Earn	Instr-Bdgt	Instr-Earn	Bdgt-Hrs	Earn-Hrs
01A	(Blank)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00
	CS		4,672.00	3,869.51	516.00	457.40	563.00	442.70	227.00	198.03	24.00	21.90	0.00	0.00	13.00	11.80	7835.18	6,706.25
	SS		549.00	490.90	256.00	230.40	47.00	39.60	42.00	24.30	0.00	0.00	0.00	0.00	0.00	0.00	1594.568	1,361.60
	Total		5,221.00	4,360.41	772.00	687.80	610.00	482.30	269.00	222.33	24.00	21.90	0.00	0.00	13.00	11.80	9429.748	8,067.86
02A			3,248.00	974.60	675.00	252.10	407.00	39.60	137.00	9.90	14.00	0.00	1.00	0.00	32.00	6.30	5859.222	1,443.06
02B			2,071.00	1,451.80	1,124.00	831.60	592.00	335.30	136.00	67.70	34.00	20.70	0.00	0.00	11.00	8.10	6175.871	4,417.29
03A			1,923.00	1,043.80	797.00	232.20	339.00	157.80	111.00	42.60	19.00	2.70	0.00	0.00	5.00	2.80	5170.759	2,106.60
03B			2,703.00	1,304.31	750.00	192.00	393.00	135.30	88.00	44.10	31.00	10.10	0.00	0.00	12.00	5.60	4844.726	2,217.65
03C			3,914.00	1,704.60	918.00	373.50	420.00	183.60	161.00	70.20	43.00	17.10	1.00	0.00	13.00	4.50	7018.475	3,286.24
04A			6,163.00	4,462.30	588.00	514.80	1,056.00	662.40	237.00	187.20	46.00	36.90	19.00	10.80	12.00	6.30	10188.762	7,929.86
04B			2,574.00	1,683.90	196.00	164.70	406.00	354.60	143.00	99.00	24.00	21.60	7.00	6.30	3.00	1.80	4372.483	3,015.67
04C			2,783.00	1,564.90	222.00	151.20	452.00	297.00	144.00	68.40	24.00	13.50	7.00	4.50	3.00	1.80	4654.137	2,622.26
04D			2,804.00	1,605.30	200.00	123.30	342.00	162.00	136.00	59.40	20.00	8.10	5.00	0.90	3.00	0.00	4537.145	2,484.25
04E			753.00	621.70	146.00	131.40	49.00	44.10	52.00	46.80	18.00	16.20	0.00	0.00	3.00	0.90	1391.979	1,244.36
04F			5,218.00	4,129.60	929.00	823.90	373.00	285.00	417.00	217.20	20.00	18.30	6.00	5.40	7.00	4.50	10089.007	7,884.35
04G			1,388.00	1,170.80	118.00	106.20	264.00	237.60	30.00	25.20	11.00	9.90	4.00	3.60	1.00	0.90	2103.347	1,818.14
05A			16,932.00	13,800.70	3,900.00	2,939.50	1,433.00	1,108.00	1,160.00	832.40	70.00	57.00	0.00	0.00	7.00	6.30	35992.431	28,187.92
06A			3,030.00	2,448.40	295.00	252.40	518.00	503.00	127.00	113.20	40.00	38.90	2.00	2.00	10.00	8.90	4748.588	4,330.17
06B			1,298.00	1,129.70	199.00	181.50	364.00	324.60	68.00	51.60	22.00	19.80	2.00	0.00	5.00	4.50	2501.447	2,173.56
07A			3,920.00	2,288.60	1,116.00	779.70	956.00	700.50	173.00	117.70	31.00	21.80	5.00	2.00	11.00	8.30	7858.459	5,009.40
07B			1,961.00	1,288.00	412.00	226.20	245.00	166.60	61.00	35.10	14.00	12.40	3.00	2.00	3.00	0.90	3417.825	2,271.66
07C			2,840.00	2,462.80	314.00	286.40	489.00	451.70	118.00	103.90	30.00	27.90	7.00	6.30	8.00	6.60	4970.018	4,370.65
08A			2,287.00	2,133.80	131.00	122.90	250.00	244.60	115.00	109.60	23.00	22.40	2.00	2.00	5.00	4.80	3845.625	3,613.22
08B			1,739.00	1,668.20	192.00	187.50	282.00	276.60	77.00	74.90	21.00	20.50	1.00	0.90	7.00	6.90	3033.407	2,926.49
08C			3,694.00	3,499.10	582.00	555.60	654.00	636.80	148.00	140.20	38.00	37.10	9.00	8.70	11.00	10.60	6602.699	6,275.63
09A			3,231.00	2,838.50	462.00	394.80	883.00	809.70	174.00	158.10	55.00	50.00	4.00	3.70	20.00	18.10	5934.656	5,512.81
09B			2,975.00	2,453.90	457.00	412.50	333.00	304.20	82.00	72.60	28.00	26.00	0.00	0.00	11.00	9.90	4767.925	4,311.47
10A			4,335.00	3,014.90	393.00	329.20	603.00	523.20	157.00	118.40	31.00	27.60	3.00	2.90	13.00	10.80	6239.189	5,078.62
11A			703.00	633.30	102.00	91.80	0.00	0.00	55.00	49.50	0.00	0.00	0.00	0.00	0.00	0.00	1298.68	1,169.62
Grand Total																		



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Progress Reports

TO System Tracking

1/17/2006 ConstructSim

Turn-over Systems Pipe Installation Tracking

ToSys	Description	Turn-over Dates			Installation Status		
		Scheduled	Submitted	Accepted	Budgt Hrs	Earn Hrs	% Comp
401	Process Piping Systems Feed Section to P-3A/B	10/26/2005			4986.6	4270.4	85.6%
402	Process Piping Systems P-3A/B Discharge to Reactor 1	10/26/2005			6615.3	5368.2	81.1%
403	Process Piping Systems Reactor 1 Through Reactor 2	3/3/2006			2195.4	1003.2	45.7%
404	Process Piping Systems Reactor 2 Through #1 & #2 Separator	3/24/2006			10287.9	3654.5	35.5%
405	Process Piping Systems Recycle Hydrogen Starting at V-9 Outlet to C-1	11/9/2005			2393.7	1637.1	68.4%
406	Process Piping Systems Amine System with Contractors and Pumps	12/8/2005			6187.6	4158.1	67.2%
407	Process Piping Systems Water Wash Delivery	11/14/2005			2455.6	2174.8	88.6%
408A	Process Piping Systems #3 & 4 Separators Forward to Level Control	12/5/2005			1935.0	1652.8	85.4%
408B	Process Piping Systems Stripper/Stripper OVHD	10/27/2005			10497.8	8961.1	85.4%
409	Process Piping Systems Sponge Oil Circuit with V-15	11/15/2005			2112.2	2091.2	99.0%
410A	Process Piping Systems Dethanizer	10/31/2005			2478.9	2472.6	99.7%
410B	Process Piping Systems Dubutanizer	10/31/2005			3847.8	3833.2	99.6%
411	Process Piping Systems Factionator/Receiver	10/31/2005			21456.9	17157.2	80.0%
412	Process Piping Systems Sour Water Recovery	9/21/2005			2501.8	2299.4	91.9%
413	Process Piping Systems 29P3 A/B Lube Oil	8/3/2005			171.2	154.1	90.0%
414	Process Piping Systems Ammonia Injection System	12/21/2005			365.8	59.5	16.3%
501A	Packaged Systems Deluge #3 Compressors	3/24/2006					0.0%
501B	Packaged Systems Deluge #2 South Pumps	3/24/2006					0.0%
501C	Packaged Systems Deluge #1 North Pumps	3/24/2006					0.0%
502	Packaged Systems Lubrimist System	3/1/2006					0.0%
503	Packaged Systems Backwash Filter System	10/21/2005			2544.9	1968.7	77.4%
601A	Electrical/DCS Systems Electrical (compressor area)						0.0%

Record: 1 of 63



Back

Systems Turnover

File View Walk Through Construct 4D Playback Tools Help

View Date: **01-Feb-06** 12-Oct-05 01-Feb-06 Interval: 1 Day Speed

Components

- BOLTUP B-01 RG103-3 (08C-45809-0)
- BOLTUP B-02 RG103-3 (08C-45809-0)
- INSTRUMENT 29LGM-1841 (08C-45809-0)
- VALVE V-01 VGA183 (08C-45809-0)

ConstructSim - Pipe Installation Exception Report

8/20/2007

Select Filter Criteria

Area: HRC Cost Code: Schedule ID:

Show Pipe Quantities < 100% Complete

ISO	Rev	Takeoff Item	Area	TO Sys	Matl	Spec	Bore	Size Group	Quantity		Labor	
									Edge	Flare	Edge	Flare
HRRC-M263AA	0	BOLTOP-01 (HRRC-M263AA)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263AB	0	BOLTOP-02 (HRRC-M263AB)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	10.0	0.0	6.5	0.0
HRRC-M263AC	0	BOLTOP-03 (HRRC-M263AC)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263AD	0	BOLTOP-04 (HRRC-M263AD)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	14.0	0.0	5.0	0.0
HRRC-M263AE	0	BOLTOP-05 (HRRC-M263AE)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	18.0	0.0	6.5	0.0
HRRC-M263AF	0	BOLTOP-06 (HRRC-M263AF)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263AG	0	BOLTOP-07 (HRRC-M263AG)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263AH	0	BOLTOP-08 (HRRC-M263AH)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263AI	0	BOLTOP-09 (HRRC-M263AI)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263AJ	0	BOLTOP-10 (HRRC-M263AJ)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	18.0	0.0	6.5	0.0
HRRC-M263AK	0	BOLTOP-11 (HRRC-M263AK)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	14.0	0.0	5.0	0.0
HRRC-M263AL	0	BOLTOP-12 (HRRC-M263AL)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263AM	0	BOLTOP-13 (HRRC-M263AM)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AN	0	BOLTOP-14 (HRRC-M263AN)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AO	0	BOLTOP-15 (HRRC-M263AO)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AP	0	BOLTOP-16 (HRRC-M263AP)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AQ	0	BOLTOP-17 (HRRC-M263AQ)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AR	0	BOLTOP-18 (HRRC-M263AR)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AS	0	BOLTOP-19 (HRRC-M263AS)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AT	0	BOLTOP-20 (HRRC-M263AT)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	3.0	0.0	1.1	0.0
HRRC-M263AU	0	BOLTOP-21 (HRRC-M263AU)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263AV	0	BOLTOP-22 (HRRC-M263AV)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263AW	0	BOLTOP-23 (HRRC-M263AW)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263AX	0	BOLTOP-24 (HRRC-M263AX)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263AY	0	BOLTOP-25 (HRRC-M263AY)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263AZ	0	BOLTOP-26 (HRRC-M263AZ)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BA	0	BOLTOP-01 (HRRC-M263BA)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263BB	0	BOLTOP-02 (HRRC-M263BB)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	10.0	0.0	6.5	0.0
HRRC-M263BC	0	BOLTOP-03 (HRRC-M263BC)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263BD	0	BOLTOP-04 (HRRC-M263BD)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	14.0	0.0	5.0	0.0
HRRC-M263BE	0	BOLTOP-05 (HRRC-M263BE)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	18.0	0.0	6.5	0.0
HRRC-M263BF	0	BOLTOP-06 (HRRC-M263BF)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263BG	0	BOLTOP-07 (HRRC-M263BG)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263BH	0	BOLTOP-08 (HRRC-M263BH)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263BI	0	BOLTOP-09 (HRRC-M263BI)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263BJ	0	BOLTOP-10 (HRRC-M263BJ)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	18.0	0.0	6.5	0.0
HRRC-M263BK	0	BOLTOP-11 (HRRC-M263BK)	Turbine	HRRC	CS	HRRC-LC-14	18-31 14to 24 in	DI	14.0	0.0	5.0	0.0
HRRC-M263BL	0	BOLTOP-12 (HRRC-M263BL)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263BM	0	BOLTOP-13 (HRRC-M263BM)	Turbine	HRRC	CS	HRRC-LC-18	18-31 14to 24 in	DI	2.0	0.0	0.7	0.0
HRRC-M263BN	0	BOLTOP-14 (HRRC-M263BN)	Turbine	HRRC	CS	HRRC-LC-20	18-31 14to 24 in	DI	20.0	0.0	7.2	0.0
HRRC-M263BO	0	BOLTOP-15 (HRRC-M263BO)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BP	0	BOLTOP-16 (HRRC-M263BP)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BQ	0	BOLTOP-17 (HRRC-M263BQ)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BR	0	BOLTOP-18 (HRRC-M263BR)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BS	0	BOLTOP-19 (HRRC-M263BS)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BT	0	BOLTOP-20 (HRRC-M263BT)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BU	0	BOLTOP-21 (HRRC-M263BU)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BV	0	BOLTOP-22 (HRRC-M263BV)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BW	0	BOLTOP-23 (HRRC-M263BW)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BX	0	BOLTOP-24 (HRRC-M263BX)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BY	0	BOLTOP-25 (HRRC-M263BY)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0
HRRC-M263BZ	0	BOLTOP-26 (HRRC-M263BZ)	Turbine	HRRC	SS	HRRC-LO-0	18-31 2.5to 6 in	DI	4.0	0.0	1.4	0.0

Total Remaining Mtlts 9015 0.0

- SUPPORT SU-01 TYPE26A (08C-45811-0)
- SUPPORT SU-02 TYPE26A (08C-45811-0)
- WELD W-01 (08C-45811-01)
- WELD W-02 (08C-45811-01)
- WELD W-03 (08C-45811-01)

Com... Task | Wor... | MyG... | UOP... | TO... | Pipe... | Pile ...

For Help, press F1 Orbit around anchor North: -1974, Elevation: -39 West: -27581,



Systems Turnover – Incomplete Work

Pipe Installation Exception Report

ConstructSim - Pipe Installation Exception Report

8/20/2007

Select Filter Criteria

Area: Cost Code:

ToSys: Schedule ID:

Show Pipe Quantities < Complete

ISO	Rev	Takeoff_Item	Area	TO-Sys	Mat'l	Spec	Bore	Size Group	UOM	Quantity		Labor		St
										Bdgt	Earn	Bdgt	Earn	
▶ 4HRC-M4263AA	0	BOLTUP-01 (4HRC-M4263AA)	Turbine	HRC	CS	4HRC-L-C	20	LB-3 (14 to 24 in.	DI	20.0	0.0	7.2	0.0	#N
4HRC-M4263AB	0	BOLTUP-01 (4HRC-M4263AB)	Turbine	HRC	CS	4HRC-L-C	20	LB-3 (14 to 24 in.	DI	20.0	0.0	7.2	0.0	#N
4HRC-M4263AC	0	BOLTUP-01 (4HRC-M4263AC)	Turbine	HRC	CS	4HRC-L-C	18	LB-3 (14 to 24 in.	DI	18.0	0.0	6.5	0.0	#N
4HRC-M4263AD	0	BOLTUP-01 (4HRC-M4263AD)	Turbine	HRC	CS	4HRC-L-C	2	SB (<= 2 in.)	DI	2.0	0.0	0.7	0.0	#N
4HRC-M4263AE	0	BOLTUP-01 (4HRC-M4263AE)	Turbine	HRC	CS	4HRC-L-C	2	SB (<= 2 in.)	DI	2.0	0.0	0.7	0.0	#N
4HRC-M4263AF	0	BOLTUP-01 (4HRC-M4263AF)	Turbine	HRC	CS	4HRC-L-C	14	LB-3 (14 to 24 in.	DI	14.0	0.0	5.0	0.0	#N
4HRC-M4263AG	0	BOLTUP-01 (4HRC-M4263AG)	Turbine	HRC	CS	4HRC-L-C	14	LB-3 (14 to 24 in.	DI	14.0	0.0	5.0	0.0	#N
4HRC-M4263AH	0	BOLTUP-01 (4HRC-M4263AH)	Turbine	HRC	CS	4HRC-L-C	18	LB-3 (14 to 24 in.	DI	18.0	0.0	6.5	0.0	#N
4HRC-M4263AJ	0	BOLTUP-01 (4HRC-M4263AJ)	Turbine	HRC	CS	4HRC-L-C	20	LB-3 (14 to 24 in.	DI	20.0	0.0	7.2	0.0	#N
4HRC-M4263AL	0	BOLTUP-01 (4HRC-M4263AL)	Cool Twr	HRC	CS	4HRC-L-E	6	LB-1 (2.5 to 6 in.)	DI	6.0	0.0	5.4	0.0	#N
4HRC-M4263AO	0	BOLTUP-01 (4HRC-M4263AO)	Turbine	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AP	0	BOLTUP-01 (4HRC-M4263AP)	Turbine	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AQ	0	BOLTUP-01 (4HRC-M4263AQ)	Turbine	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AR	0	BOLTUP-01 (4HRC-M4263AR)	Turbine	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AS	0	BOLTUP-01 (4HRC-M4263AS)	Cool Twr	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AT	0	BOLTUP-01 (4HRC-M4263AT)	Cool Twr	HRC	SS	4HRC-L-D	3	LB-1 (2.5 to 6 in.)	DI	3.0	0.0	1.1	0.0	#N
4HRC-M4263AU	0	BOLTUP-01 (4HRC-M4263AU)	Turbine	HRC	SS	4HRC-L-D	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
4HRC-M4263AV	0	BOLTUP-01 (4HRC-M4263AV)	Turbine	HRC	SS	4HRC-L-D	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
4HRC-M4263AW	0	BOLTUP-01 (4HRC-M4263AW)	Turbine	HRC	SS	4HRC-L-D	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
4HRC-M4263AX	0	BOLTUP-01 (4HRC-M4263AX)	Turbine	HRC	SS	4HRC-L-D	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
4HRC-M4263AA	0	BOLTUP-02 (4HRC-M4263AA)	Turbine	HRC	CS	4HRC-L-C	20	LB-3 (14 to 24 in.	DI	20.0	0.0	7.2	0.0	#N
4HRC-M4263AC	0	BOLTUP-02 (4HRC-M4263AC)	Turbine	HRC	CS	4HRC-L-C	18	LB-3 (14 to 24 in.	DI	18.0	0.0	6.5	0.0	#N
4HRC-M4263AD	0	BOLTUP-02 (4HRC-M4263AD)	Turbine	HRC	CS	4HRC-L-C	14	LB-3 (14 to 24 in.	DI	14.0	0.0	5.0	0.0	#N
4HRC-M4263AE	0	BOLTUP-02 (4HRC-M4263AE)	Turbine	HRC	CS	4HRC-L-C	14	LB-3 (14 to 24 in.	DI	14.0	0.0	5.0	0.0	#N
4HRC-M4263AJ	0	BOLTUP-02 (4HRC-M4263AJ)	Turbine	HRC	CS	4HRC-L-C	20	LB-3 (14 to 24 in.	DI	20.0	0.0	7.2	0.0	#N
4HRC-M4263AJ	0	BOLTUP-02 (4HRC-M4263AJ)	Cool Twr	HRC	CS	4HRC-L-B	18	LB-3 (14 to 24 in.	DI	18.0	0.0	6.5	0.0	#N
4HRC-M4263AK	0	BOLTUP-02 (4HRC-M4263AK)	Cool Twr	HRC	CS	4HRC-L-B	8	LB-2 (8 to 12 in.)	DI	8.0	0.0	2.9	0.0	#N
4HRC-M4263AL	0	BOLTUP-02 (4HRC-M4263AL)	Cool Twr	HRC	CS	4HRC-L-E	6	LB-1 (2.5 to 6 in.)	DI	6.0	0.0	5.4	0.0	#N
4HRC-M4263AJ	0	BOLTUP-04 (4HRC-M4263AJ)	Turbine	HRC	CS	4HRC-L-C	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
4HRC-M4263AK	0	BOLTUP-04 (4HRC-M4263AK)	Turbine	HRC	CS	4HRC-L-C	4	LB-1 (2.5 to 6 in.)	DI	4.0	0.0	1.4	0.0	#N
										Total Remaining MHs	901.5	0.0		

Record: 1 of 156



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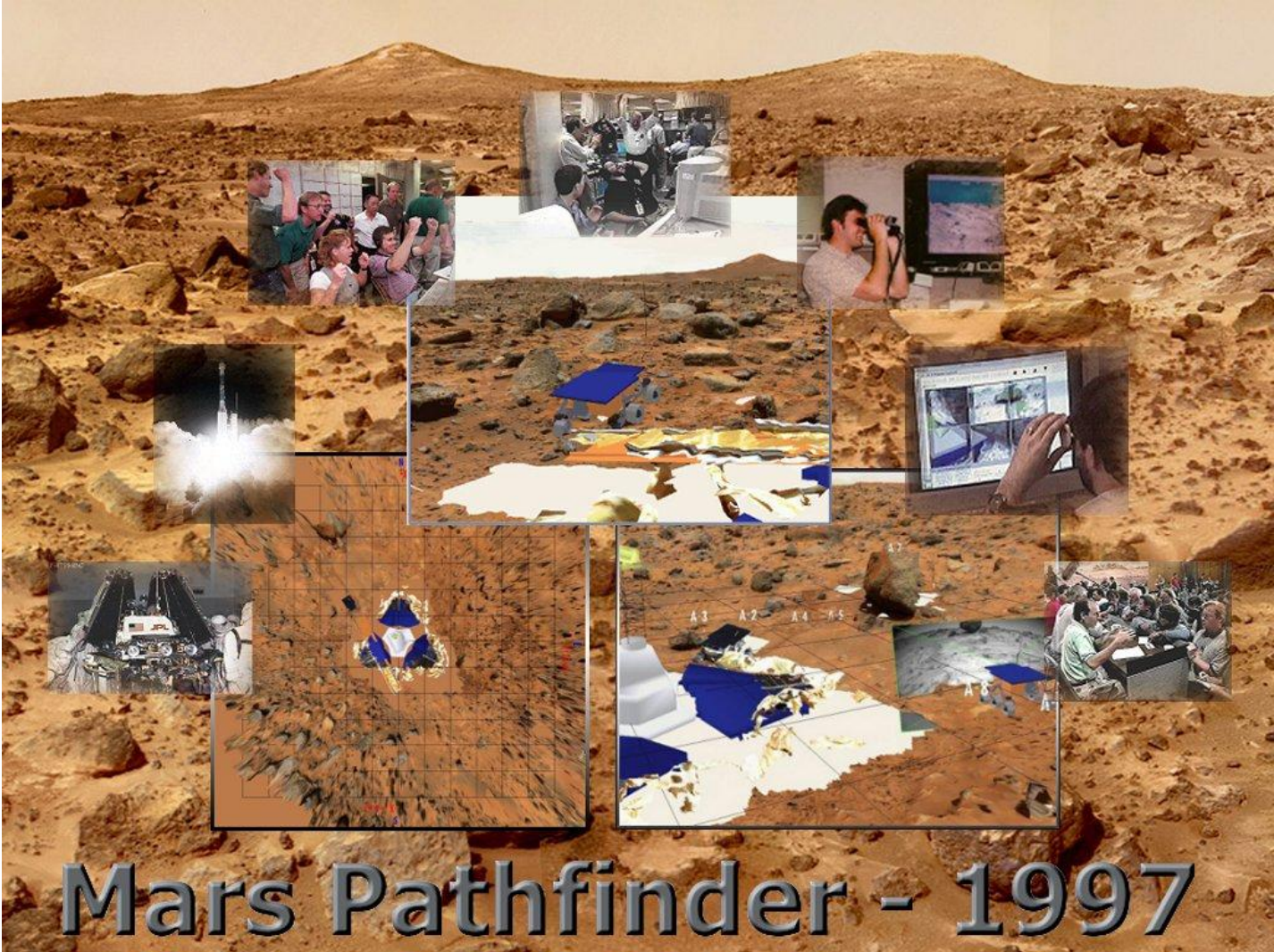
Work Process Topics

- **Engineering Inputs**
- **Path of Construction**
- **Work Pack Development**
- **Sub-contractor coordination**
- **Lookahead Planning**
- **Equipment Planning & Tracking**
- **Shop Fabrication – Modular Construction**
- **Streamline Materials**
- **Progressing & Reporting**
- **Revision Management**
- **Turnover Systems**
- **Revision Analysis**

Construction Driven Engineering

- **Pull Driven Scheduling**
 - Prioritization / monitoring of engineering & fabrication
- **Defining data requirements**
 - Engineering to construction handovers
 - Specifications
 - Contractual Terms
- **Technology Approach**
 - Federated Information Workflows

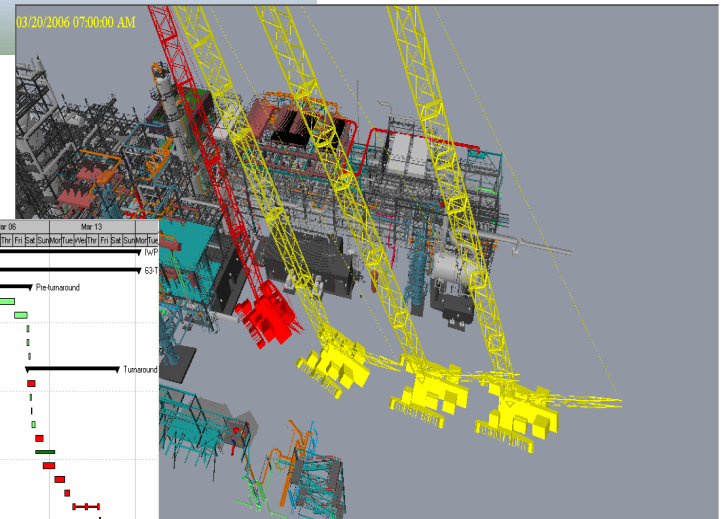
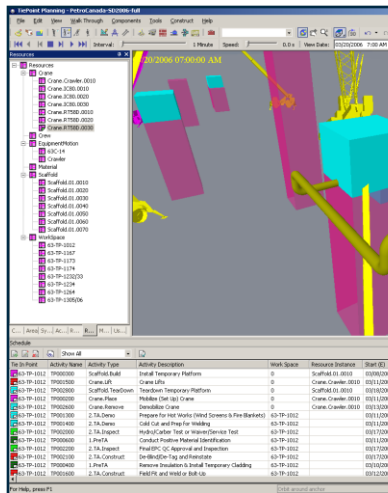
NASA Heritage



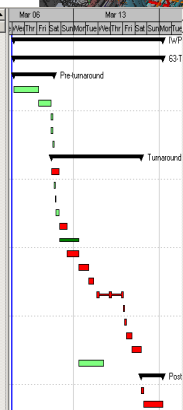
Mars Pathfinder - 1997

Beta - Scaffold / Crane Resource Module

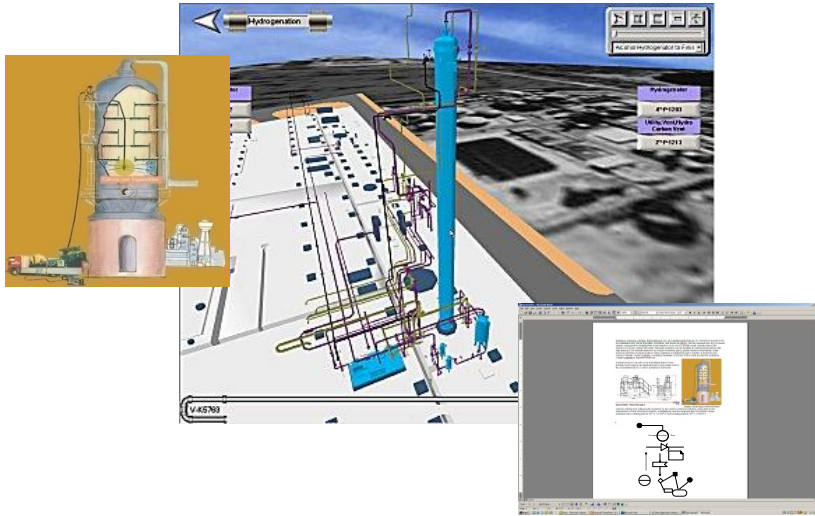
- Dynamic link to P3E
- Automated link to Tie-in List (XLS format)
- User specifies placement of
 - Cranes
 - Scaffold / Temp Work Platforms
 - Crew workspaces
- Crew Density Analysis
- Equipment motion simulation



Activity Name	Planned Duration	Tie In Point	CSin Activity Type	Resource Instance	Work Space	Labour Force
WIP: 0010	243h					60.00
63-TP-1012	243h					60.00
Pre-turndown	39h					14.00
Install Temporary Platform	4h	63-TP-1012	ScaffoldErect	Scaffold:01.0010	63-TP-1012	4.00
Remove Insulation & Install Temporary Cladding	20h	63-TP-1012	1.PieTA		63-TP-1012	3.00
Mark Trench Point Location and Confirm Dimensions	4h	63-TP-1012	1.PieTA		63-TP-1012	2.00
Conduct Positive Material Identification	4h	63-TP-1012	1.PieTA		63-TP-1012	2.00
Measure Wall Thickness	2h	63-TP-1012	1.PieTA		63-TP-1012	2.00
Turndown	149h					38.00
Mobilize (Set Up) Crane	15h	63-TP-1012	Crane Place	Crane Crawler 0010		0.00
Gas Free & Safe	2h	63-TP-1012	2.TA.Demo		63-TP-1012	2.00
Lock Out/Tag Out/Blank Permits	2h	63-TP-1012	2.TA.Demo		63-TP-1012	0.00
Prepare for Hot Works (Install Screens & Fire Blankets)	6h	63-TP-1012	2.TA.Demo		63-TP-1012	6.00
Cold Cut and Prep for Welding	10h	63-TP-1012	2.TA.Demo		63-TP-1012	6.00
Crane Lifts	30h	63-TP-1012	Crane Lift	Crane Crawler 0010		0.00
Field Fit and Weld or Bolt-Up	20h	63-TP-1012	2.TA.Construct		63-TP-1012	6.00
Visual QA and Tag for X-Ray	15h	63-TP-1012	2.TA.Inspect		63-TP-1012	3.00
Post Weld Heat Treatment	10h	63-TP-1012	2.TA.Construct		63-TP-1012	2.00
X-ray Additional NOT if Required	10h	63-TP-1012	2.TA.Construct		63-TP-1012	2.00
Hydro/Cathar Test or Water/Service Test	2h	63-TP-1012	2.TA.Inspect		63-TP-1012	3.00
De-Blind/De-Tag and Re-ratiate	4h	63-TP-1012	2.TA.Construct		63-TP-1012	3.00
Final EPC QC Approval and Inspection	10h	63-TP-1012	2.TA.Inspect		63-TP-1012	2.00
Install Temporary Insulation	15h	63-TP-1012	2.TA.Construct		63-TP-1012	4.00
Demobilize Crane	40h	63-TP-1012	Crane Remove	Crane Crawler 0010		0.00
Post-turndown	30h					3.00
Install Insulation	4h	63-TP-1012	3.PieTA		63-TP-1012	4.00
Takedown Temporary Platform	30h	63-TP-1012	ScaffoldTakedown	Scaffold:01.0010	63-TP-1012	3.00

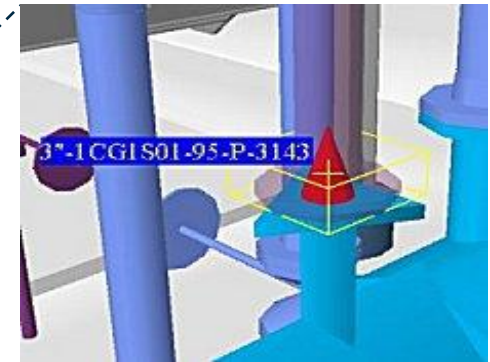
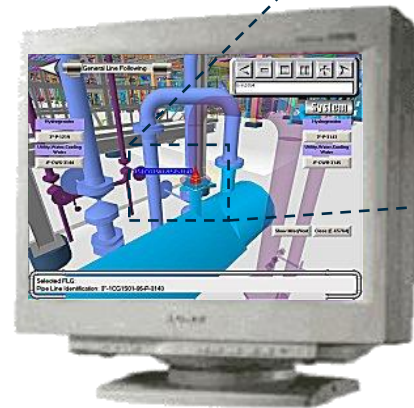


OpSim Insight



- Perform systems analysis and training in a virtual model
- Drive the Virtual Model from PowerPoint training slides
- Capture operator knowledge and experience digitally in the virtual model

Enable a better trained workforce in a safer work environment.



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